FOODTECH TRENDS

GLOBAL REPORT OF THE INNOVATIONS THAT WILL DISRUPT THE FOOD ECOSYSTEM

2021 edition

DigitalFoodLab

DIGITALFOODLAB

10 YEARS IN FOODTECH

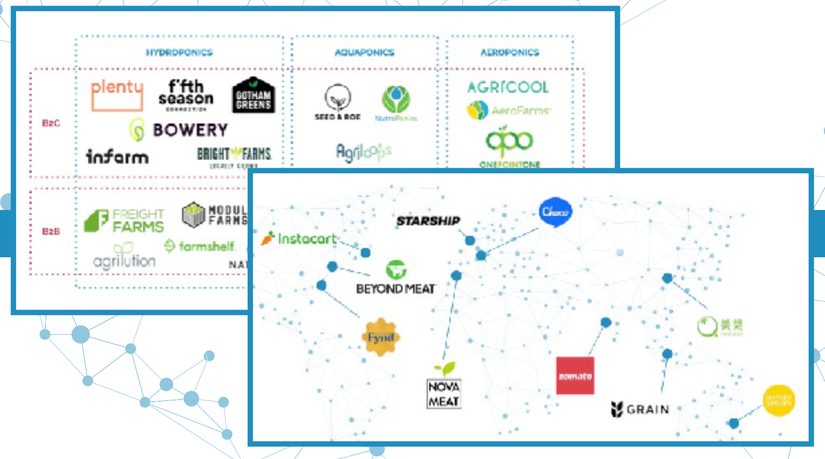
We are Jérémie & Matthieu:

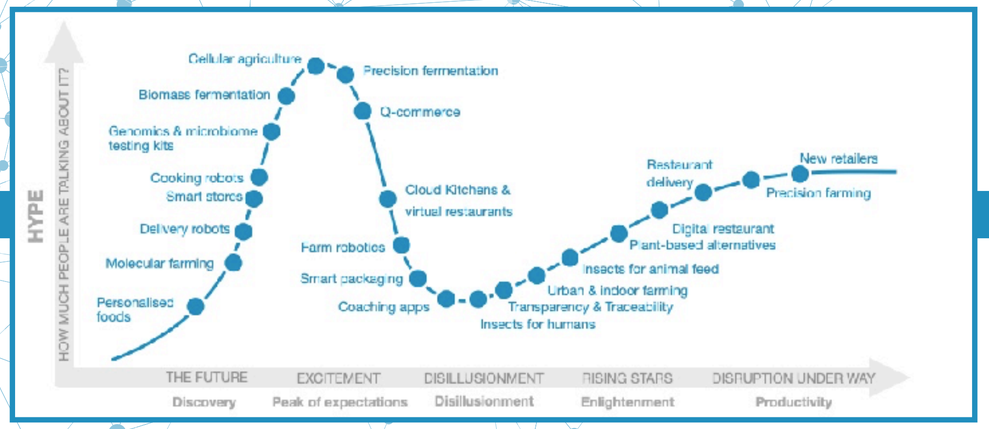
- **Entrepreneurs**, founders of one of the first French FoodTech startups (2010-16), raised €1M+ capital and successfully exited
- **FoodTech experts**, co-founders of DigitalFoodLab
- **Angels**, **advisors** and **board members** of 20+ FoodTech startups

DIGITALFOODLAB

A GLOBAL PERSPECTIVE TO IDENTIFY THE BEST OPPORTUNITIES

€20B
INVESTED EACH YEAR IN 20,000 STARTUPS





Our mission is to transform the noise created by thousands of startups' innovations into opportunity analysis…

… and then to build strategies matching your goals and challenges to act on it.

DIGITALFOODLAB

WE HELP YOU NAVIGATE THE FUTURE OF FOOD

UNDERSTAND - What is happening with FoodTech?

Understand the short, medium and long term trends

IDENTIFY - What are the key opportunities for your company?

Identify the best areas of innovation and build a shared strategy

ACT - How to work with and benefit from the innovation ecosystem?

Build the best innovation strategy step by step to leverage your innovation all over the world

We have worked with some of the best agrifood, retail and finance corporations. Contact us to see how we can help you shape the future of food.

Limagrain de la terre à la vie · Cargill · Nestlé · bel · Coca-Cola European Partners · METRO · MSCI

DIGITALFOODLAB IN ACTION

FROM NOISE TO RESULTS - OUR METHOD

Our four step process is here to help you identify and leverage opportunities in any space.

Discovery

Workshops to understand the global foodtech ecosystem and what's happening in the space.

Goal: validation of the space to study

Opportunity screening

DigitalFoodLab answers the question "startup" + "space" = "?" By identifying 10 to 15 areas (products, software, service, hardware) where Innovation is happening.

Goal: identify areas of opportunity

Deep Dives

We select three areas with the client. DigitalFoodLab makes a deep dive for each of them to identify the leaders and the long term trends. DigitalFoodLab defines a strategy for each (M&A, investment, development…)

Goal: validation of a strategy for each of the selected opportunities

Action

From the selected strategies, DigitalFoodLab identifies the best possible partners or targets.

CONTACT US

HELLO,

Welcome to the age of FoodTech disruption.

First of all, we thank you for reading this report. This is the fourth edition of our yearly report on FoodTech Trends. Each year, we gather all our knowledge on this fascinating ecosystem and try to make sense of it by creating an analysis of what is happening and what will happen next. This year, we have decided to make this report public and easily (and hence, freely) available to all.

From our analysis and DigitalFoodLab's database, we have identified **23 FoodTech trends and have grouped them into five "mega trends"** that make it easier to understand the forces shaping this ecosystem:

- **Sustainable proteins**: even from outside the ecosystem, this would have been hard to miss with billions invested, dozens of new products reaching our supermarket shelves and discussions about almost magical technologies such as cellular agriculture. The goal here is simple: provide the world with multiple new reliable, sustainable and affordable sources of proteins. These won't replace animal proteins in the short term but they may at least absorb the growing demand for more protein in the next10 to 15 years.

23 trends and five mega trends shaping the future of food.

- **The resilient farm:** the growing desire for a shorter, more sustainable and resilient supply chain has only been accelerated by the pandemic. Entrepreneurs are working in three directions: making the farm smarter, inventing the crops of the future (notably to sustain the growth of alternative proteins) and creating the farm of the future.

- **The future of retail**: again the pandemic has boosted an already growing ecosystem. Entrepreneurs have shifted their focus from meal delivery to groceries, notably with new retailers and quick-commerce startups. Always at the cutting edge, the foodservice ecosystem is repositioning itself around better management of procurement, payment and more broadly solving the question of how to make the restaurant a more efficient operation.

- **Food automation**: new regulations and concerns are competing with the desire with faster and faster delivery of food products. Potential solutions range from automating all or parts of the food supply chain from warehouses to utilizing cloud kitchens and smart stores to deliveries performed by robots and drones.

FoodTech is the future of food. The inflexion point is getting closer.

- **Personalised food**: still a far-fetched dream, the idea of providing each consumer with food products (from nutritional advice to supplements or even meals) that are truly personalised to his or her needs is gaining more ground as DNA and microbiome companies grow. New ventures are combining multiple techniques to provide real value in terms of advice to the consumer. Even then, the question of converting it into a shopping list remains open.

As shown by DigitalFoodLab's multiple reports and insights, investments in the FoodTech ecosystem are rising fast and have reached an inflexion in the first half of 2021. Beyond new ventures and R&D, this money tends to go toward financing infrastructure investments to realise new capabilities such as bioreactors, plants to produce new animal feed, plant-based substitutes, etc. This shows that some of the trends underlined in this report are getting closer to the point where they will be competitive and will disrupt the market. Others are still maturing, but entrepreneurs have the means to make them move much faster.

FOODTECH TRENDS
WHAT IS FOODTECH?

DigitalFoodLab's definition is: "*FoodTech is the ecosystem made up of all the agrifood entrepreneurs and startups (from production to distribution) innovating on products, distribution, marketing or business model.*"

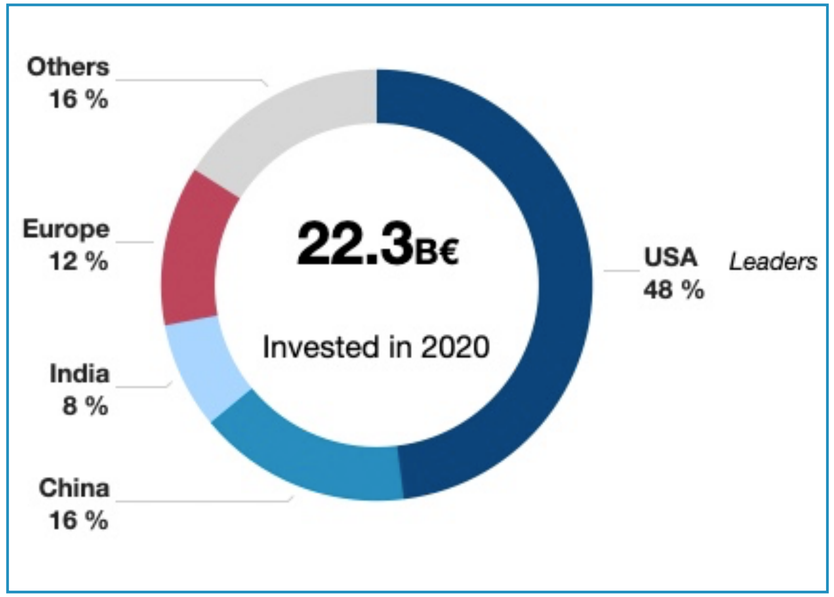
For us, FoodTech is made up of 6 categories: AgTech, Food Science, Foodservice, Delivery, Consumer Tech and Supply Chain.

More online: here is the list and definition of all the sub-categories, ranging from ag-biotech to virtual restaurants.

FOODTECH TRENDS
WHERE IS FOODTECH HAPPENING?

Firstly, it's worth noting that there is not a unified “FoodTech ecosystem”, but there are many different sub-ecosystems in various places.

As shown in the graph, **looking for innovation in the US is not enough**. Outside the US, FoodTech main territories are in Europe (France, the UK, the Nordics, the Netherlands and Germany for the most part), India, and China. As for the rest of the world, Israel, Canada & Australia may be the most exciting places to consider. There are no FoodTech trends that can be understood only by looking only at these countries. Entrepreneurs are looking for inspiration on other continents, European startups look toward the US for expansion, and US startups target the Asian market, etc.



We can identify three main factors of motivation for food entrepreneurs:

1- **money** or creating a big business in a space ripe for digitisation or disruption

2- **climate** which is becoming one of the biggest drivers of food entrepreneurs

3- **health** by creating an access to better and more personalised foods

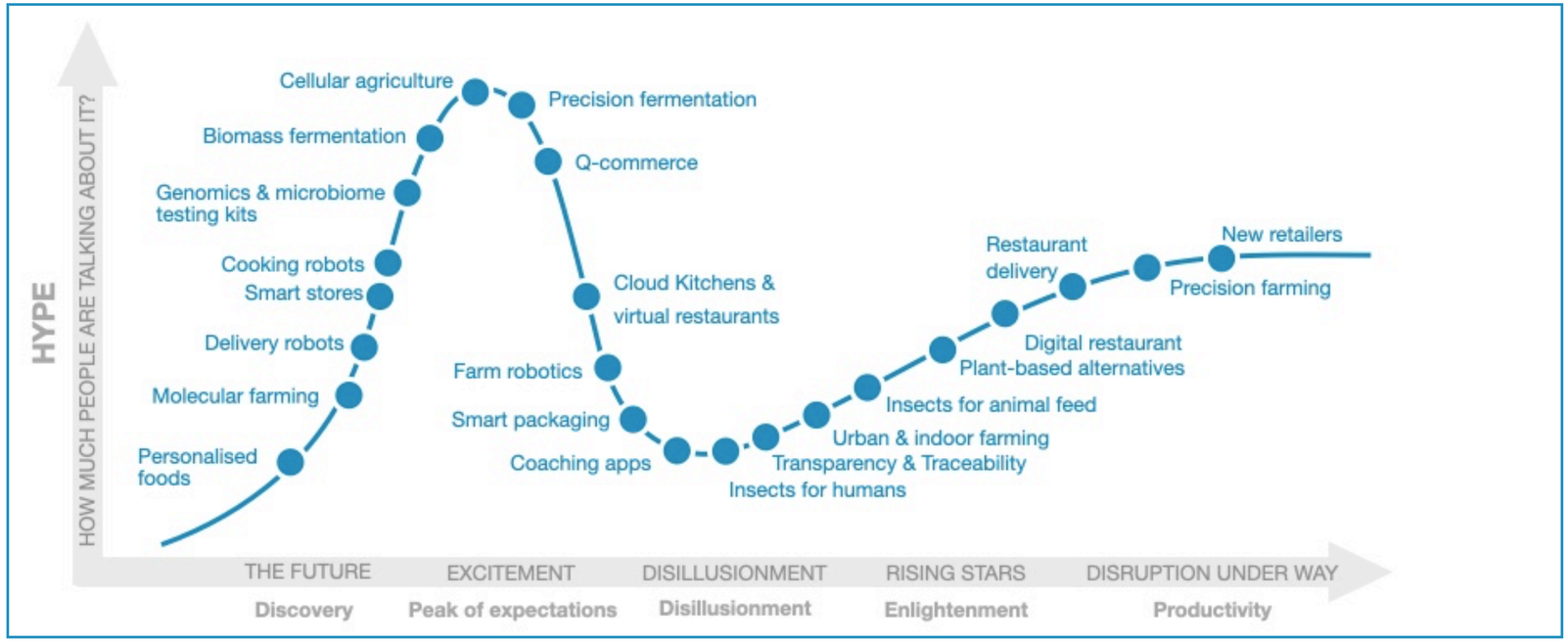
HYPE CYLE CURVE

5 MEGA TRENDS,

23 AREAS FOR FOOD DISRUPTION

We have mapped the most relevant FoodTech trends on two axes:

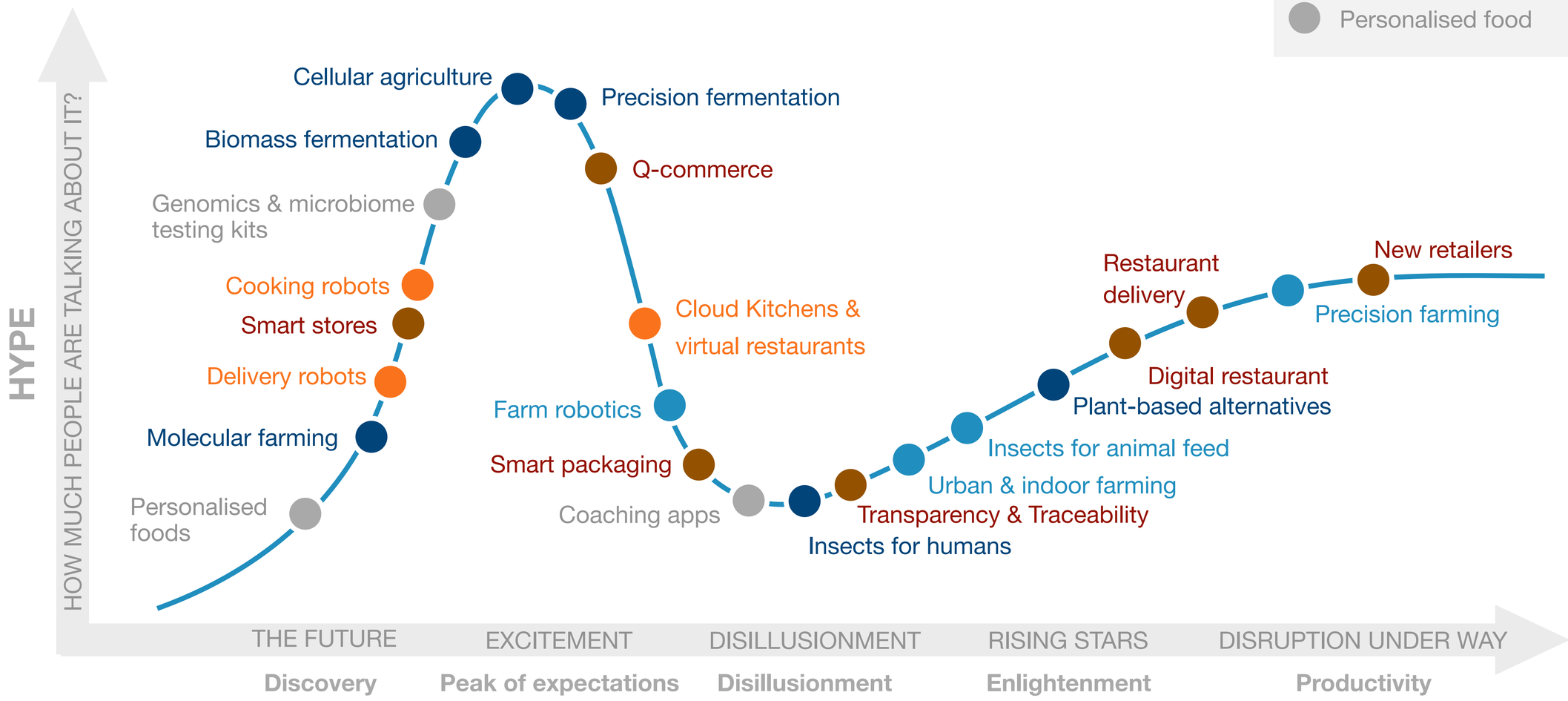
- **Hype**: how much hype is there about the technology or trend (i.e. how many positive press or social media mentions)
- **Time**: meaningful tech trends tend to evolve through 6 phases from technology trigger (discovery), a peak of expectation (everyone is talking about it without having seen anything), disillusionment, enlightenment (when profitability and mass use seem reasonable expectations) and the plateau of productivity (when it has become common and profitable).



HYPE CYCLE CURVE

5 MEGA TRENDS,

23 AREAS FOR FOOD DISRUPTION



HYPE CYCLE CURVE

5 MEGA TRENDS,

23 AREAS FOR FOOD DISRUPTION

How do we recognise the level of maturity?

- **Market adoption**: this is by far the most important criterion. Knowing the extent to which businesses or consumers are adopting the service or product is the best way to know how mature a “food disruptor area” is.
- **Ecosystem structure**: the more mature an ecosystem is, the more structured it is and often this can be translated by its level of “integration”. We can broadly distinguish three phases:
  - The genius phase: very few companies work on the “area” and they have many problems to solve. Hence, startups have to focus on multiple problems and do different jobs.
  - The structuration: when some interest (or hype) comes to an area, new players start to focus on limited parts of the value chain, often structuring it around a downstream and upstream approach.
  - The expansion: when some market validation has been reached (or sometimes when the hype is very high but still no market validation has occurred yet), we often observe the appearance of new startups focusing on more niche subjects (sometimes by being providers of services or products to other startups of the space). Two clues to identify this stage are the presence of startups creating services targeting other startups in the same space and the presence of the consultant-turned-entrepreneur.

HYPE CYCLE CURVE
BEYOND THE CURVE

Some elements of the FoodTech ecosystem that are still attracting a lot of interest are not on this curve, this is not some mistake for DigitalFoodLab's part. Here are the two main reasons:

1 - **product innovation versus disruption**: many FoodTech entrepreneurs are what we would have called food innovators a few decades ago. They are launching interesting new food products (often with a direct to consumer strategy) around new spaces such as CBD, food supplements, low-carb. All of these ventures are good and well but they don't have the potential to change fundamentally the way we eat.

2 - **already productive**: DTC or DNVB (Digitally Native Vertical Brand) startups were part of this curve a few years ago. But now the path is almost straightforward and this trend is installed and here to stay. It is changing the food system in many ways but it is no more in our scope.

3 - **disappeared or dispersed trends**: some areas of innovation have vanished as companies failed to materialise on their promise. Some, as the ecosystem around algae have dispersed and are now components of larger (and more impactful) ones.

4 - **too small to be a "trend"**: many startups are working on potentially disruptive technologies but they are almost alone on their space. So, until they represent a "trend" with a wave of new ventures, they are excluded from this framework.

FOODTECH TRENDS IN 2021

MEGA TREND 1: SUSTAINABLE PROTEINS

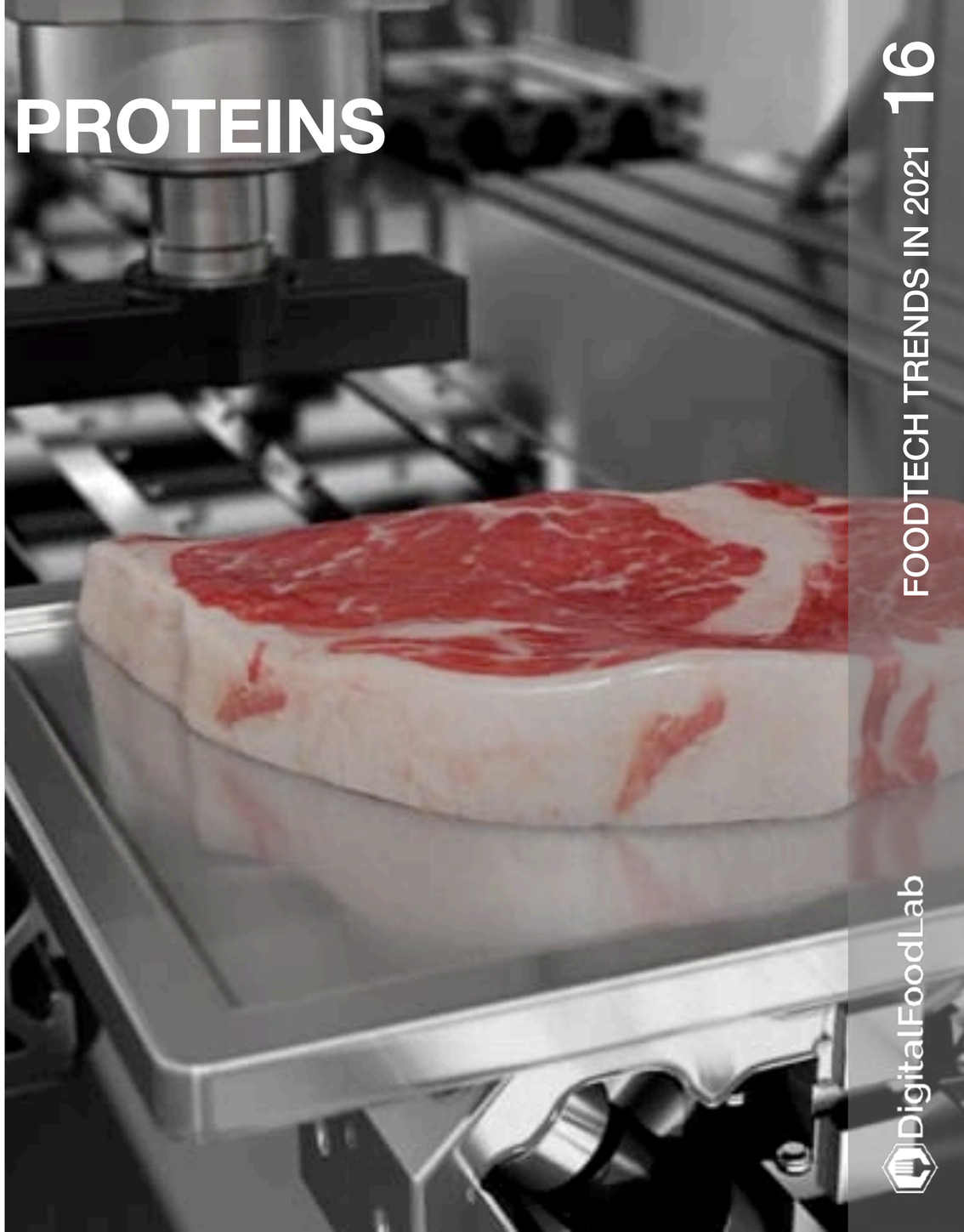
Stockeld Dreamery is a Swedish plant-based cheese startup using legumes (most other startups in this space use nuts or coconut oil). It recently raised $20M to grow its production and its distribution. Cheese may be one of the areas most ripe for disruption.

MEGA TREND #1: SUSTAINABLE PROTEINS

WHAT IS THE TREND ABOUT?

Even from outside the FoodTech ecosystem, this trend would have been hard to miss. With the creation of hundreds of startups, the investment of billions of dollars and a growing competition from large corporations, the interest in the future of proteins is strong. However, it may also be hard to read this ecosystem, to understand how it is structured, why it is here and where it may go.

Animal protein consumption is rising fast. It already **represents more than 18% of global greenhouse emissions**. All the technologies that are looking to disrupt this space have at least one thing in common: they want to make the future of proteins much more sustainable. Therefore, knowing whether one or more of these disruptors will win a significant market share in the coming decades is more than a multi-billion dollar question. It may also have decisive impact on our environment and the way humans live on this planet.

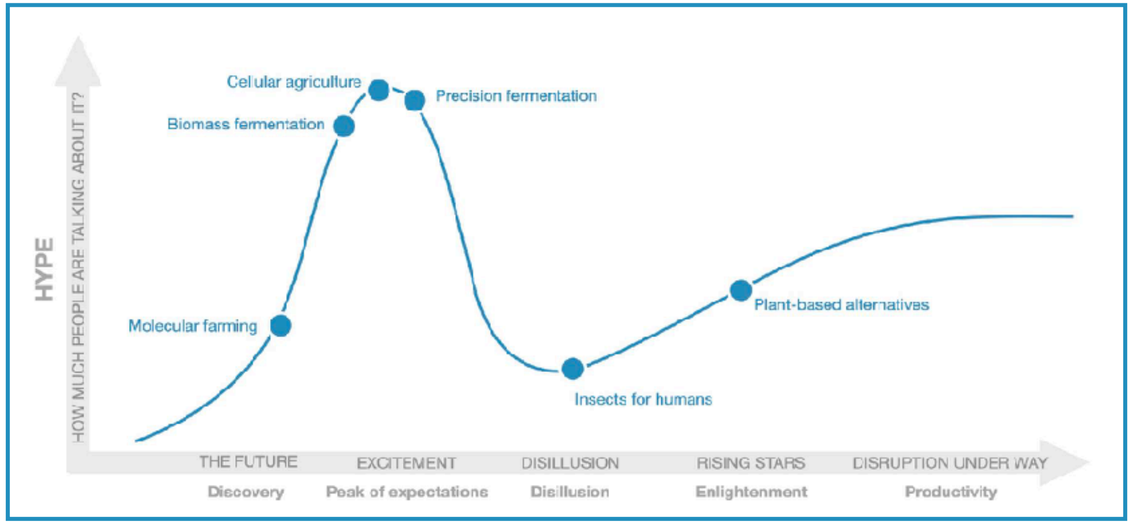


MEGA TREND #1: SUSTAINABLE PROTEINS

THE DISRUPTORS

We have identified on this curve **6 food disruptors** that threaten the status quo in the protein industry. These ecosystems, identified by the technology they use, are until now very distinct from each other. They use technologies and techniques that are mostly unique to them. This may change in the coming years as some players are making rapid progress as their industry matures and some techniques (such as 3D printing) could be used in many areas. Their position on this curve is mostly relative to each other rather than an absolute:

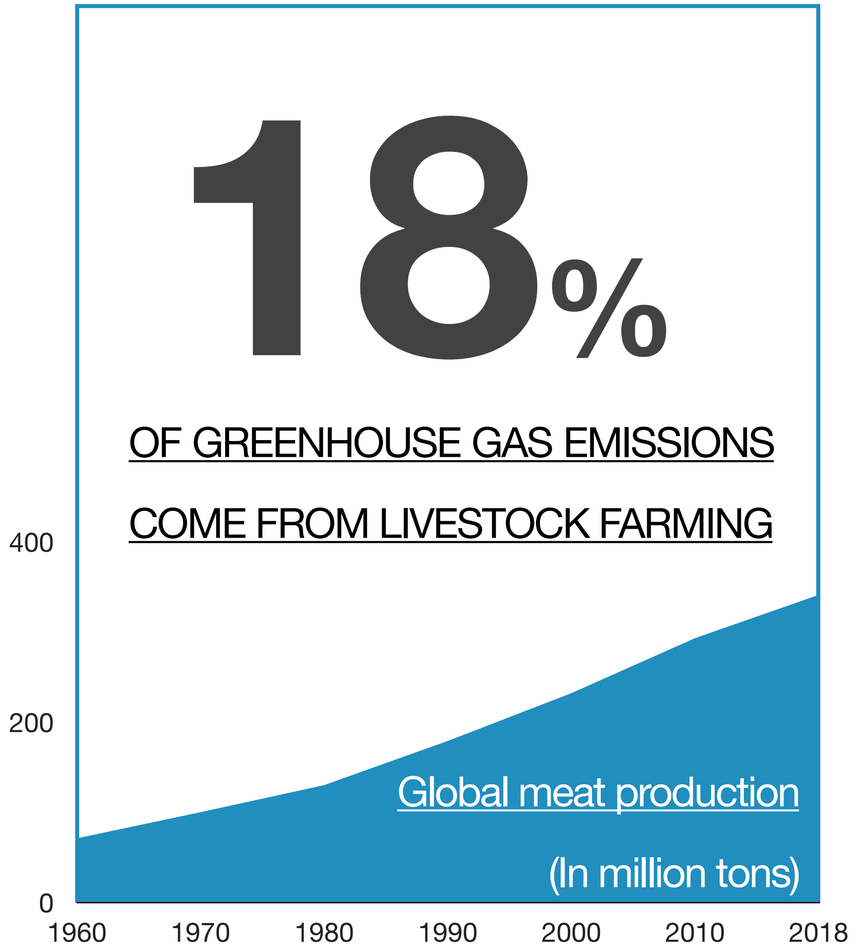
- **Plant-based alternatives** are the most advanced. However, many challenges remain to reach full productivity.
- **Insects for humans** companies are in a hard position. After years of regulatory fight, insects now can be more easily sold in the West, but they have been lost some of their attractively as plant-based products appear now as “the alternative”.
- **Cellular, biomass and molecular farming** are still far behind as they face technology, market and regulatory challenges. However, they are approaching a peak of hype as more and more journalists are talking about it (notably to report startups’ very optimistic predictions).



The protein disruptors hype curve

MEGA TREND #1: SUSTAINABLE PROTEINS

THE FOCUS ON PROTEINS



A few years ago, many of the most talked-about FoodTech startups were working on DTC (Direct-To-Consumer) products ranging from beverages to snacks. One could wonder why the focus has switched to proteins specifically. We can identify at least 2 reasons:

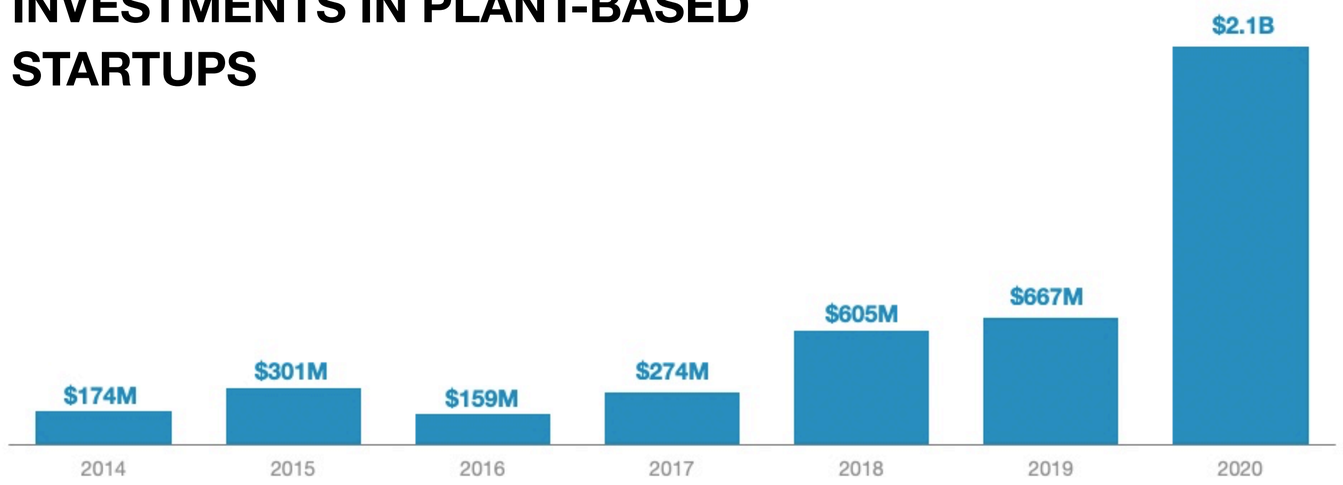
1. the increasing consciousness that animal proteins are the source of a significant and growing part of the greenhouses gases emitted
2. the size of the opportunity. **Animal-based products are currently a $1.4 trillion market**. It will keep growing. As a strong correlation exists between a country reaching middle-income status and the consumption of animal proteins, we can expect that in the coming decades, billions of people will then start to consume more meat and dairy products.

Hence, for investors in search of companies that have both a huge market to address and a real impact on climate change (as alternative proteins are 5 to 100 times better in terms of greenhouse emissions, land use and water consumption), this space is highly attractive.

MEGA TREND #1: SUSTAINABLE PROTEINS

PLANT-BASED

INVESTMENTS IN PLANT-BASED STARTUPS



Source: Good Food Institute

The Beyond Meat effect

Beyond Meat's IPO in mid-2019 had a significant impact on the ecosystem. It was a catalyst that boosted the number of ventures in the space, the deals between startups and retailers, and to an ever greater extent the investments toward them.

How to read this ecosystem?

This ecosystem is first and foremost a B2C ecosystem that addresses consumers' desire for products that feel, taste and cook like a "real" animal product. Hence, it can be first read by the category of product substituted (from beef to dairy).

Additionally, it can be read according to the volume of sales substituted (significant in milk, minimal in meat), the potential (limited in milk, huge in meat) and the technical barriers that remain before price and quality parity is reached.

MEGA TREND #1: SUSTAINABLE PROTEINS

PLANT-BASED

Burgers, nuggets, milk, and cheese

The leaders in this space first focused on burgers and now it seems that the ecosystem is shifting its attention toward nuggets (both leaders announced that they were launching products) and milk (both have hinted interest). While this should keep them busy for the next couple of years, it seems that their **next move could be around cheese** which is a space that more and more startups are exploring.

Plant-based in the hype curve

The plant-based ecosystem is now near productivity. Few people still contest that it will become a big market. However, a few challenges remain: scaling production, creating protein-rich crops suited for these products, cleaning and shortening the labels and improving texture.

This last item is key as the current technologies (notably around extrusion) limit the range of products (it is still complex to create whole cuts and credible fish alternatives).

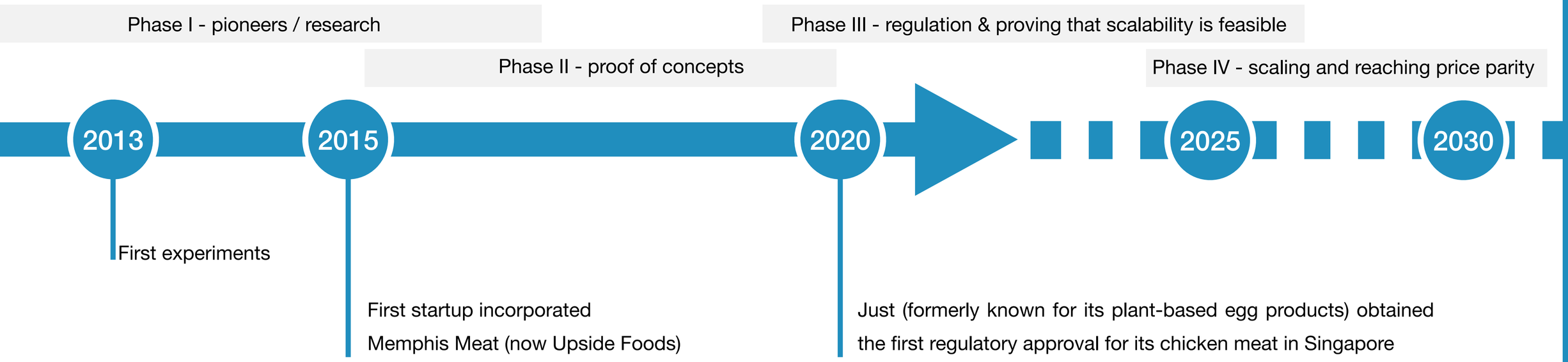
PLANTED

Planted (Switzerland) is one of the leading European plant-based startups. With pork and chicken chunks substitutes, it focuses on new categories. Planted shows that now a new venture entering this space has to differentiate either through technology or by addressing new products / markets).

MEGA TREND #1: SUSTAINABLE PROTEINS

CELLULAR AGRICULTURE HISTORY

In a word, the main idea behind cellular agriculture is to use stem cells from animals and make them multiply (in bioreactors while using a nourishing medium) in order to recreate the animal cells that compose the muscles we eat as meat. While simple on paper, it is obviously a huge challenge when the goal is to use this technology to compete with animal meat in terms of available quantities, taste, texture and price. However, from science fiction or mad-scientist-like experiment, cellular agriculture is now widely considered a potentially viable technology that could challenge everything we know about food. Massive deployment and price parity with animal-based products still seem to be far away as these will require massive upfront investments (notably in bioreactors).

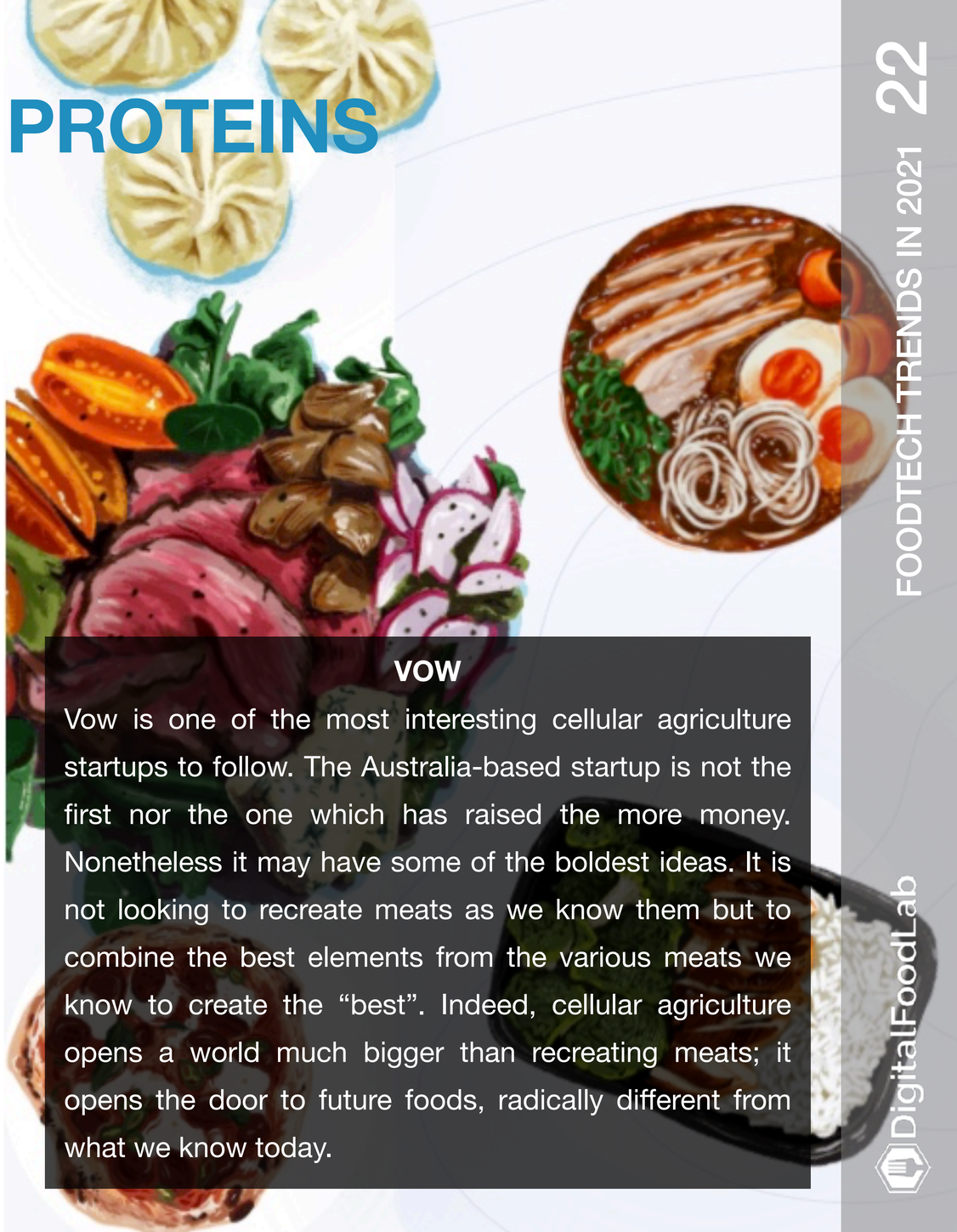


MEGA TREND #1: SUSTAINABLE PROTEINS

CELLULAR AGRICULTURE

How to read this ecosystem?

- The category of products targeted: originally most companies were focused on beef but now the range is large (from chicken to fish, breastmilk, fats…)
- The level of integration: the pioneers are still very integrated but a new generation of startups is now specialising (downstream or upstream in cell lines or bioreactors).
- IP: some companies have some level of IP, but many are mostly relying on trade secrets
- How close it is to the market: most startups are moving out of the labs and opening their pilot production plants
- Regulation: how advanced the startups are in their negotiations with various regulators (notably in Singapore, Israel, Europe and China).
- Business model: B2C (as a brand) or B2B (with a SaaS approach) by renting the technology and the materials needed.

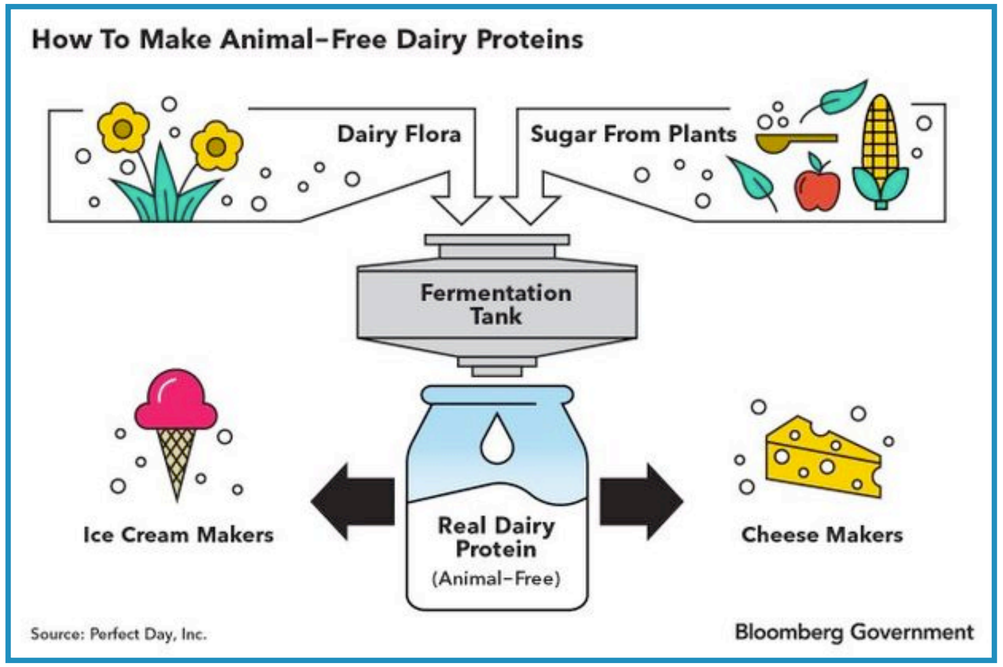


VOW

Vow is one of the most interesting cellular agriculture startups to follow. The Australia-based startup is not the first nor the one which has raised the more money. Nonetheless it may have some of the boldest ideas. It is not looking to recreate meats as we know them but to combine the best elements from the various meats we know to create the “best”. Indeed, cellular agriculture opens a world much bigger than recreating meats; it opens the door to future foods, radically different from what we know today.

MEGA TREND #1: SUSTAINABLE PROTEINS

PRECISION FERMENTATION



The process of precision fermentation is quite simple: companies use a genetically modified micro-organism (typically yeast) to make it produce the desired proteins.

The state of the ecosystem

Precision fermentation is not as new as it may seem. It has been used for decades for products such as insulin or rennet (an ingredient used in the process to make cheese) to replace animal-based ingredients with a product with that has greater purity and reliability. This concept has been pioneered in food by two companies: Perfect Day (founded in 2014, $361M raised) for dairy and Clara Foods (2015, $57M) for eggs.

Today, **the focus is mostly on dairy products** with many new ventures raising significant capital in this space. Many target the $240B cheese market (more specifically its B2B part). Essentially, their first target is the mozzarella that is put on top of pizzas as it is both light in flavour but hardly replaceable by plant-based products (plant-based cheese don't stretch very well).

Startups see themselves as the suppliers of the dairy proteins of the future and hence as replacements of the dairy farms that we know today.

MEGA TREND #1: SUSTAINABLE PROTEINS

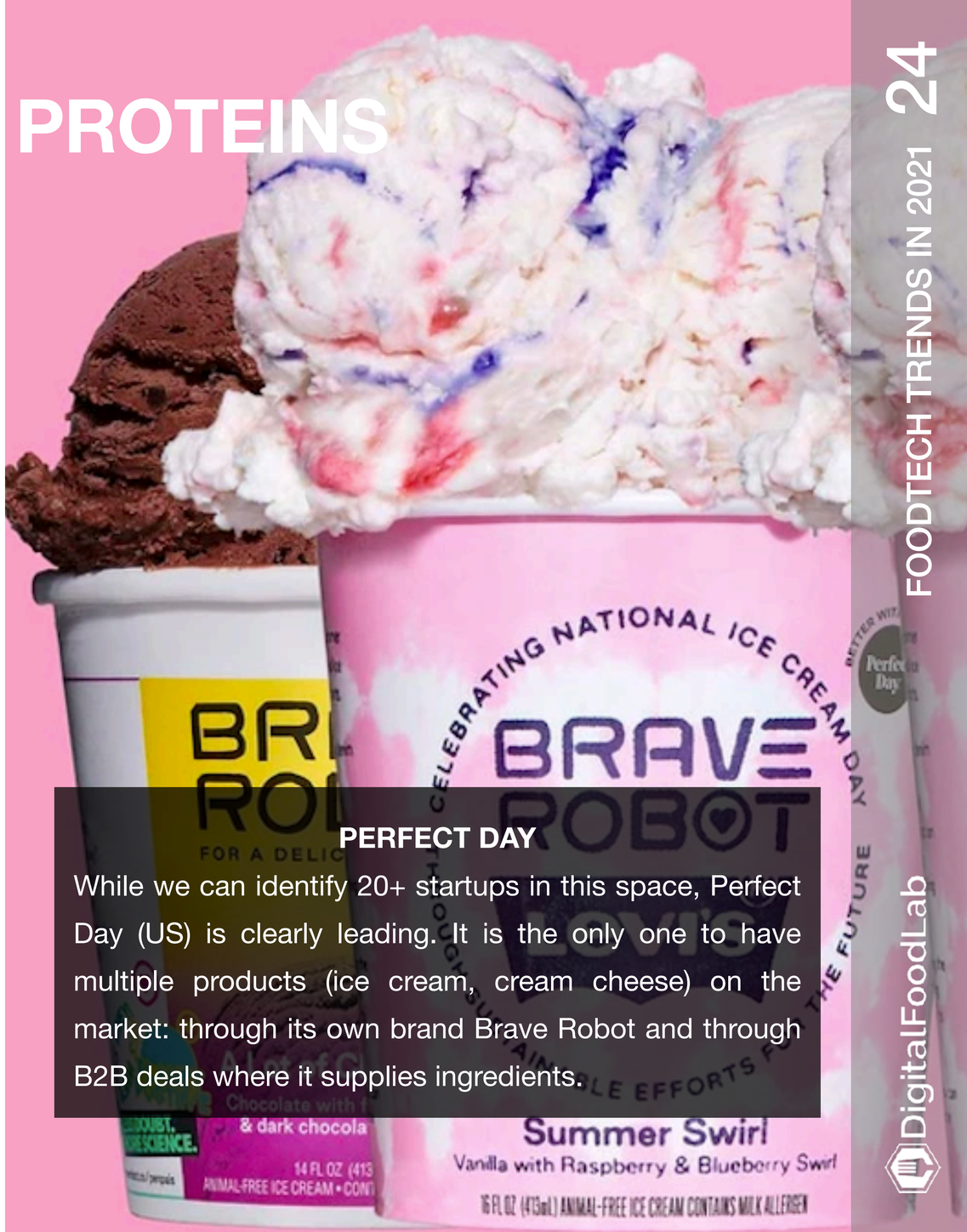
PRECISION FERMENTATION

Precision fermentation in the hype curve

Precision fermentation is closer to market than most alternative protein technologies. Some ice creams are even sold under various brands in the US (and have been recognised as safe by the FDA). If regulation may prove more challenging in other continents (notably Europe), it should not be an impossible challenge.

However, this ecosystem is now facing bigger challenges. First, it has to scale its production and reduce its costs. Second, it has to prove that it can develop more liquid products (which require more types of casein, a key dairy protein, which combined create the special mouthfeel of dairy products such as milk and mozzarella) that will taste as good as the animal-based ones.

We are confident that this ecosystem will succeed on these steps. **If it reaches price parity at scale, then the current dairy industry could be heavily disrupted and even replaced very shortly afterward.**



PERFECT DAY

While we can identify 20+ startups in this space, Perfect Day (US) is clearly leading. It is the only one to have multiple products (ice cream, cream cheese) on the market: through its own brand Brave Robot and through B2B deals where it supplies ingredients.

MEGA TREND #1: SUSTAINABLE PROTEINS

BIOMASS FERMENTATION

More than one technology, biomass fermentation is a common concept used by different groups of startups. While most traditional companies working on fermentation around food (mostly upstream B2B companies) produce ingredients that will be incorporated in recipes to improve the taste or create new functionalities, **biomass fermentation companies use fermentation to produce proteins that will become the main component of future products** (which will be alternatives to dairy, meat, fish…). They look in nature for exceptional microorganisms (yeasts, bacterias) which will enable such production at an acceptable cost. We can identify **two sub-groups: the extremophile ecosystem and the "CO2 to protein" ecosystem.**

Extremophiles

This first group, the closest to market, is led by Nature's Fynd (2012, $508M), a US startup that has identified a very specific microorganism in Yellowstone National Park which thrives in extreme conditions (notably in terms of the nutrients it needs and in terms of conditions of pressure and temperature). Concretely, it means that the process can happen in much less strict conditions compared to other fermentation processes and that the final output can be used as an economically viable source of proteins for mass market products. Nature's Fynd already has a couple of products on the market (burger patties and cream cheese) and is in discussion with many large corporations that are looking to use it

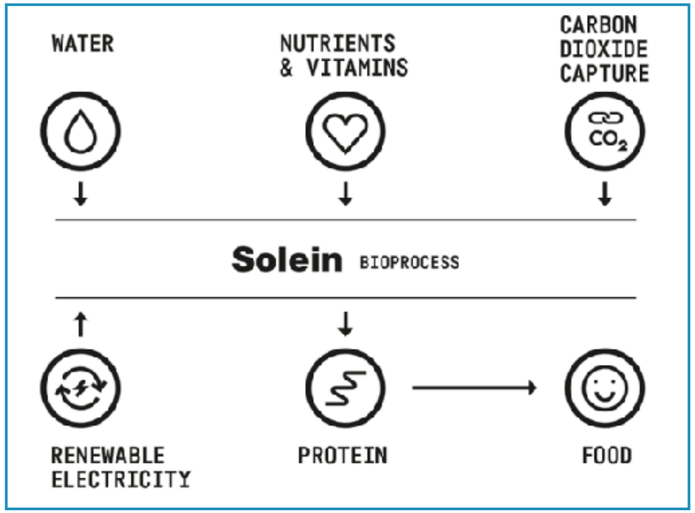
MEGA TREND #1: SUSTAINABLE PROTEINS

BIOMASS FERMENTATION

CO2 to protein

While seeming fairly magical, the production of proteins from carbon dioxide is serious. Its leader, Solar Foods (2017, $42M), is in talks with food companies that could use its ingredient. It relies on a specific microorganism that feed itself from carbon dioxide. The output is a protein powder that can be supplemented and then transformed into food products such as meat replicates. Startups work both on B2C and B2B (animal feed) strategies.

Again, this ecosystem faces challenges of scale and texture. It also requires that the carbon capture technology progresses and that more reusable energy becomes available at a low cost.



Solar Foods' process requires only natural resources such as water and electricity. Nutrients and vitamins have to be added to transform the captured carbon into edible food.

Biomass fermentation in the hype curve

While Biomass fermentation startups have much less of a regulatory challenge than other animal protein alternatives, they still have two other big challenges:

- creating a profitable and scalable model
- texture and consumer habits: their protein is a new completely new ingredient. It will require some time to make appealing products and to explain them to the consumer.

MEGA TREND #1: SUSTAINABLE PROTEINS

INSECTS FOR HUMANS

The insects for human consumption ecosystem is being under structuration even if the first startups appeared more than 5 years ago. Today, actors can be mapped according to their business, as UPSTREAM actors (production and process) or DOWNSTREAM actors (transformation and marketing). The upstream ecosystem is less prolific, but it is stronger and more developed. On the other side, the downstream companies have to face legislation, especially in Europe, and consumer acceptance in western countries.

Since the first B2C insect startups appeared, we have witnessed a **very high failure rate in the ecosystem**, around 70 to 80%.

MEGA TREND #1: SUSTAINABLE PROTEINS

INSECTS FOR HUMANS

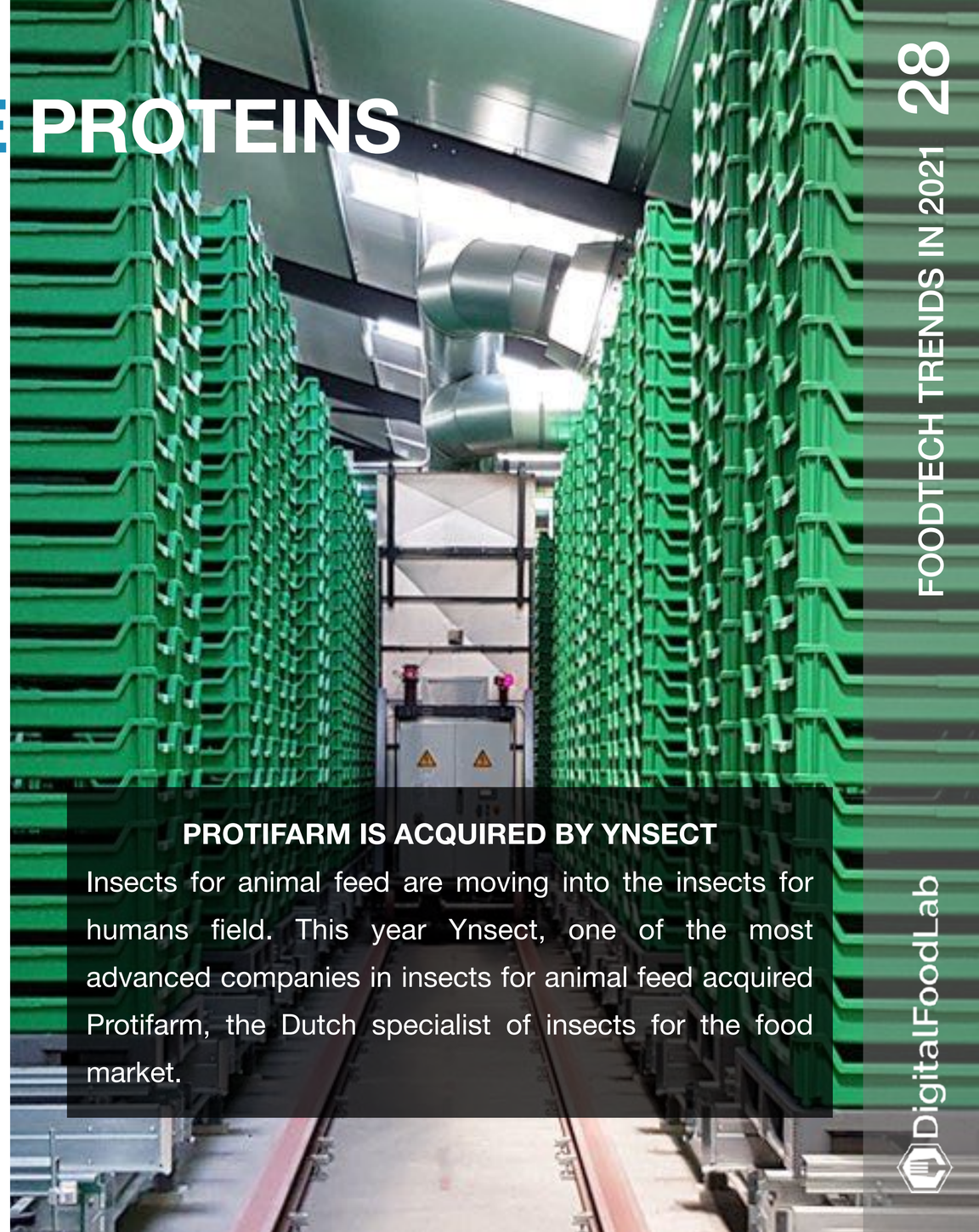
Marketing authorisation

On January 13th 2021, the European Food Safety Authority (EFSA) delivered a positive opinion about one insect species as a novel food. But this is only the first step for a marketing authorisation since the European Commission has yet to endorse the final decision.

As of today, in 2021, insects for human consumption are still prohibited in Europe except for some countries in which a “transition period” applies.

We expect that with future approval the upstream ecosystem will benefit from large food companies’ acceleration in the insect field. Some challengers should appear in the next few years, but we likely have future leaders already on the market, as well as actors which will switch from feed (like Ynsect).

Regarding the downstream ecosystem, we are less optimistic. Western consumers do not seem ready to eat whole insects yet.



PROTIFARM IS ACQUIRED BY YNSECT

Insects for animal feed are moving into the insects for humans field. This year Ynsect, one of the most advanced companies in insects for animal feed acquired Protifarm, the Dutch specialist of insects for the food market.

MEGA TREND #1: SUSTAINABLE PROTEINS

MOLECULAR FARMING

Molecular Farming is a very nascent sub-ecosystem led by a handful of startups. The basic idea is close to precision fermentation with a twist: plants can be the best bioreactors. Hence the goal is to have genetically modified plants which will “grow” the desired proteins in the field rather than in bioreactors in labs.

This ecosystem is led by Moolec (Argentina) and Nobell Foods (USA, $75M raised). The latter focuses on cheese alternatives and expects to have its first batches of products by the end of 2022.

While the technology is highly promising, it has to prove its ability to scale and to face regulatory challenges (and consumer reluctance for everything genetically modified).

Beyond these startups, this ecosystem also shows a growing appetite for creating new crops that could be better sources of protein (better in taste, with more protein and with more variability in terms of products that can be made out of them).

MEGA TREND #1: SUSTAINABLE PROTEINS

ENABLERS

Plant-based startups aim to increase the amount of proteins in their product (as plants have a lower ratio of proteins compared to animal-based products). One answer could be to “develop” crops with a better protein ratio.

Most of the plants we eat today are human-made evolutions of ancient crops developed through breeding and selection. Startups are now working to quicken this process through bio-engineering and machine learning. There are two major ways to achieve it:

- with non-GMO processes, using **bio-technologies to sequence DNA, big data and machine learning** to identify the best matches (like Equinom)
- with the **gene-editing CRISPR-CAS-9 technique** (non-GMO but controversial), a “find and replace” gene technique. Startups in this domain are able to create crops (pea, wheat) with a protein ratio up to 40%.

Among the most notable players are:

- Inari, a US startup which has raised nearly $340M ($208M in May 2021), aims to build a “seed foundry” with the ability to recreate genetic diversity and create a feedback loop directly connected to farms.
- Caribou Biosciences, also an American startup, which had its IPO last July. It is using Crispr-Cas9 technology in various domains, among which agriculture in order to create crops with high-protein profiles.
- Equinom, an Israeli company, which develops non-GMO improved seeds and raised $20M this year. It has in its portfolio a high-yield sesame, and a pea variety that has a 40% higher ratio of proteins.

DIGITALFOODLAB IN ACTION

SPEAKING - DISCOVERY

As FoodTech experts, DigitalFoodLab co-founders speak at many public and private events (virtually or on-site). They like to share their passion for the future of food and engage with an audience about the consequences and help them to prepare for it.

They speak about the following subjects:

- The state of FoodTech and FoodTech trends
- The future of food and how it will impact agribusinesses and consumers
- Personalised focus on specific food domains (from startups working on coffee to personalisation)
- Collaborations between corporations and startups

CONTACT US

FOODTECH TRENDS IN 2021

MEGA TREND 2:

THE RESILIENT FARM

US-based indoor farming startup Plenty is one of the leading startups in this highly competitive space. It has raised $541M. It develops large urban vertical farms with plants growing on tall towers.

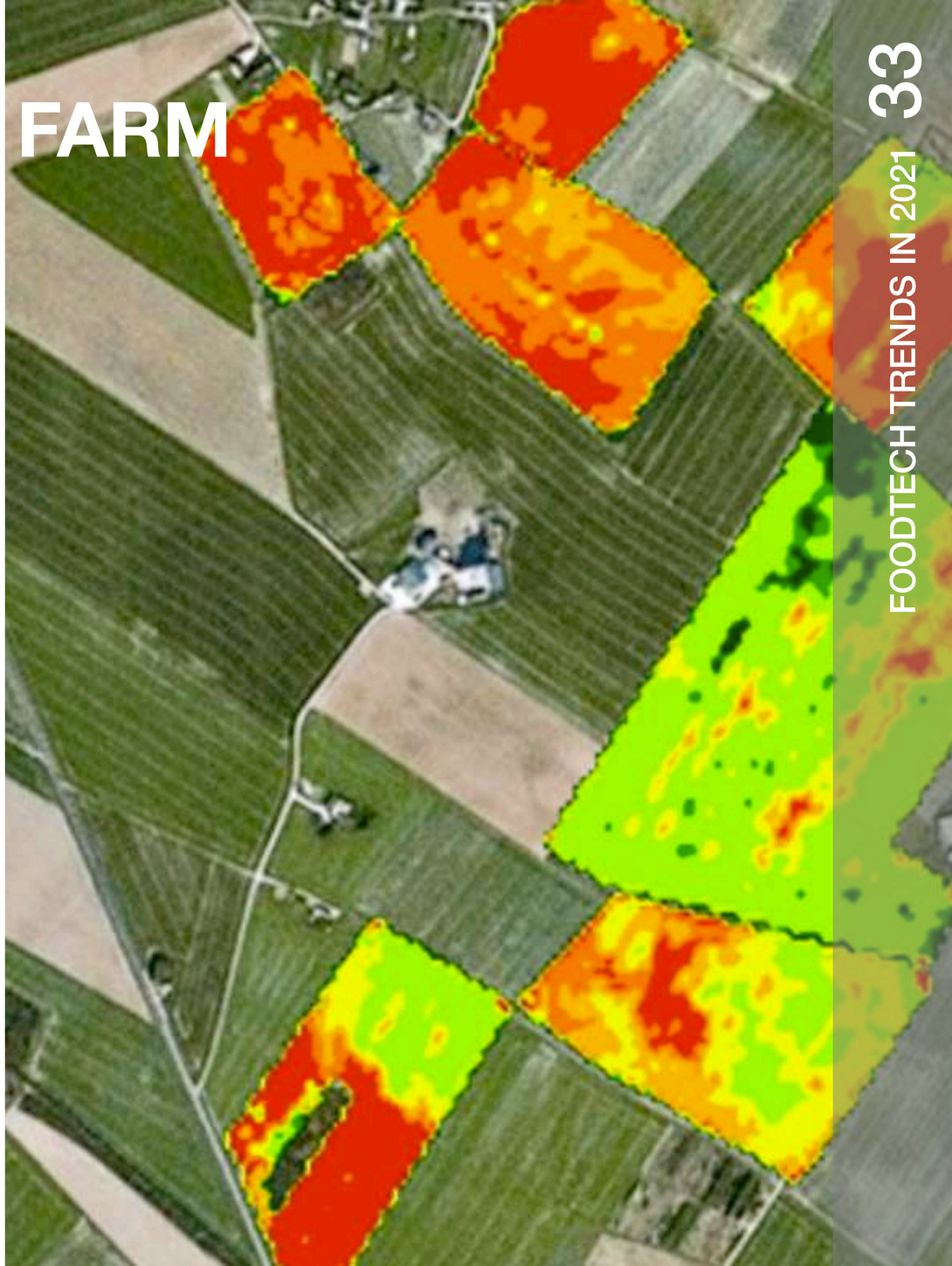
MEGA TREND #2: THE RESILIENT FARM

WHAT IS THE TREND ABOUT?

It has always been DigitalFoodLab's conviction that AgTech is a key component of the FoodTech ecosystem and not a separate one. Indeed, we see more and more convergence and integration in the farm-to-fork value chain. For example, without a more resilient farm, there is no "mega trend #1 for sustainable proteins" as the ingredients for plant-based foods or the nutrients for precision fermentation and cellular agriculture will have to come from these farms.

Multiple trends are driving us toward a more sustainable and resilient farm: the growing appetite for proximity, climate change concerns notably in terms of arable land, and the convergence of technology and farming.

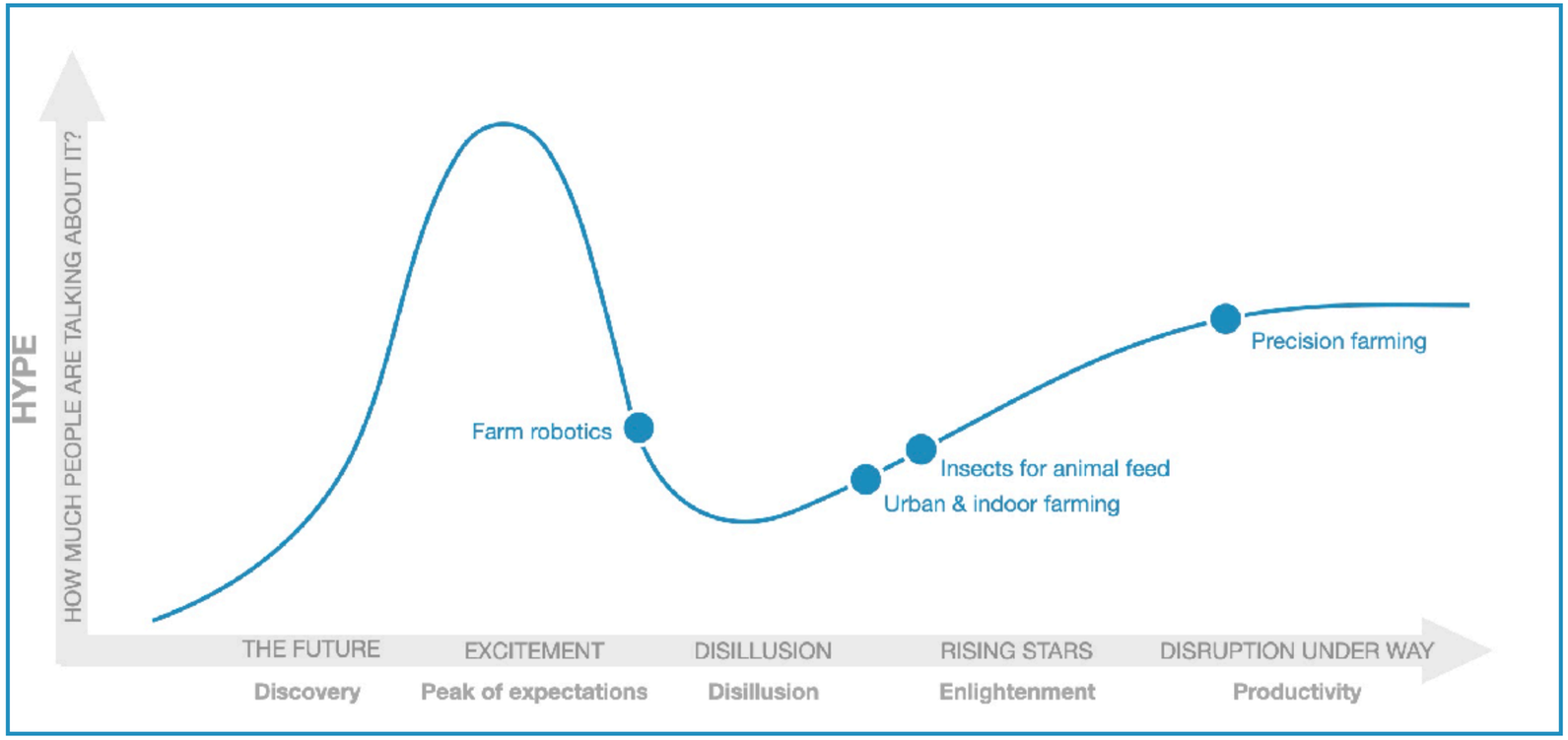
This trend is going in two very different directions. The first one is **augmenting and making the current farm smarter**. The second is the space comprising **urban, indoor, next generation farms**. The farming system of the future will certainly be a combination of the two.



MEGA TREND #2: THE RESILIENT FARM

THE DISRUPTORS

We have identified on this curve 4 food disruptors that threaten the status quo of the way farming is done today.



The farm disruptors hype curve

MEGA TREND #2: THE RESILIENT FARM

PRECISION FARMING

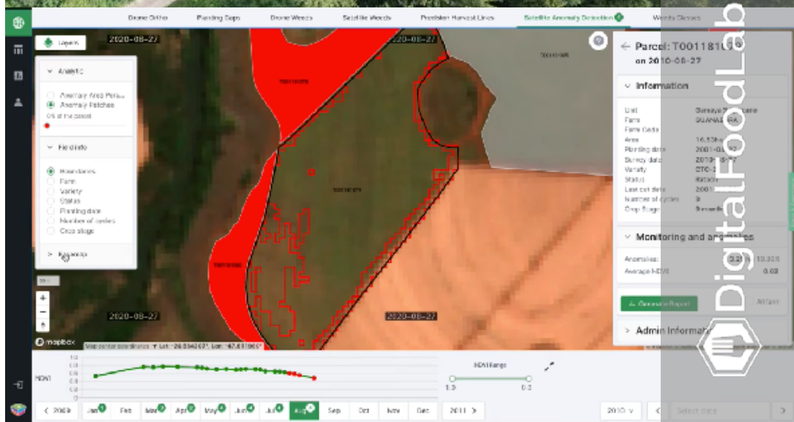
Precision farming is a farming management concept based on measuring and analysing data from the field. It aims to **increase the level of food production by improving the decision-making, traceability and quality of farm products**. AgTech startups are at the core of this agricultural revolution. They offer sensors (and IoT devices), drones and satellite imagery and software to farmers.

This sector has attracted more than €4 billion over the last ten years and is one of the oldest in the Ag/FoodTech area. Today, the ecosystem is mature with most of the companies well established and profitable.

However, precision farming is mostly developed in countries with large farms (US, Canada, Brazil…) but has yet to expand into smaller ones like those found in Europe, Asia or Africa.

Among the most notable players to watch, we can mention:

- fieldin, an American-Israeli startup that has just completed a $30 million Series B.
- the British startup AGRIVI which provides tools for farms and supply chain management.
- SeeTree, an Israeli startup which has raised nearly $50M and operates mostly in North and South America.



MEGA TREND #2: THE RESILIENT FARM

FARM ROBOTICS

The world of agriculture has always been looking for more automation and solutions to improve productivity and reduce the most difficult human tasks. From sensitive fruits pickers (Harvest Croo Robotics, USA) to weed-removing robots (Nexus Robotics, Canada), there is a wide range of robots to address agricultural issues and help farmers in their daily tasks.

Farm robotics companies are working on hardware products but it is the “intelligence” inside the robots which makes the difference. Contrary to classic “automatic devices” used in farms to perform repetitive tasks, **robots developed by startups are full of artificial intelligence and generally use machine learning vision systems to be able to determine if a fruit is ripe, healthy or not, or ready to pick.**

Even though we have been talking about it for a long time, farm robotics is still in its R&D stage. Robots are not yet on every farm and a lot of experiments are still required.

Investments in this sector are still limited too, because startups are not ready to grow commercially. We can mention recent rounds from Vitibot (FR, *picture*), which raised €11M less than a year ago, and is developing an electric vine straddle robot; or also from Ecorobotix (Switzerland) which raised $14.7M in June and builds an autonomous weeding robot.

MEGA TREND #2: THE RESILIENT FARM

INSECTS FOR ANIMAL FEED

Almost a decade old, the insect ecosystem has evolved from its focus on human nutrition toward animal feed. In the last couple of years, some of them have moved from experimentation to mass production. Europe is leading in this domain in quite a surprising way. As many ventures were created to focus on human foods made for protein (*see p.24*), many countries banned these products as untested and potentially unsafe. This has led many startups to move toward B2B and then animal feed.

When AgTech startups become industry players

The leading company in this area is Ynsect, which has raised 320M€ since its inception ten years ago. It started by focusing on aquaculture and pet food. Now it is moving toward food for humans (with the acquisition of Protifarm) and insect-based fertiliser.

To support this growth, insects for animal feed is one of the few areas where startups have to develop industrial facilities. This has many benefits on the ecosystem as a whole, as it physically shows that startups can be more than gig job providers.

MEGA TREND #2: THE RESILIENT FARM

DEEP DIVE #2: URBAN FARMING

Entrepreneurs have been thinking about the “farm of the future” for decades (if not centuries). Nowadays, we think of it as **urban farming**.

Beyond this term are various realities:

- **indoor farms** which are farming facilities in controlled environments.
- **urban farms** which are farms inside cities, they can be low tech (actual farms, farming on the rooftops) or high tech.
- **vertical farming** as opposed to the traditional “horizontal farming”.

When we talk about urban farming, we mean the combination of the three models mentioned: indoor and vertical farms inside city limits. Hence, for us, **urban farming is the idea of using technology to produce food products directly at their point of consumption or distribution.**

Financing the farms of the future

In 2021, many startups in this space have become public companies through SPACs (Special Purpose Acquisition Companies). This shows that the market is ready to finance this subject and that large amounts of money will be needed to scale urban farms from their pilots to global ventures.

MEGA TREND #2: THE RESILIENT FARM

DEEP DIVE #2: URBAN FARMING

How to read this ecosystem?

This ecosystem can be quite difficult to read as it has not yet “converged” toward one technology or one business model. We can understand it by using 6 items, starting with the most important:

1- where is the urban farm located? (On the roof, a shelf inside a building, underground, or is it the building itself?).

2- how technologically integrated is the company? (Does it master the whole value chain or is it “only” a space manager or does it rent out its technology).

3- what is the technology? (Aeroponics, Hydroponics, Aquaponics).

4- what is the business model? (B2B or B2C - I have my own brand).

5- Is it centralised (big warehouses) or decentralised (small units inside supermarkets for example)?

6- what is its intention with robotics?

When answers to these questions emerge, the ecosystem itself will enter the productivity stage and much more financing can then be expected.

MEGA TREND #2: THE RESILIENT FARM

DEEP DIVE #2: URBAN FARMING

THE SWITCH FROM COMPETING ON TECHNOLOGY TO THE BEST MODEL

In DigitalFoodLab's 2019 FoodTech trend report, we discussed the momentum around urban farming and analysed it through two lenses: technology and business model.

Technological innovation is the first step to developing an urban farming startup, and we have witnessed more and more automation in the sector. But, last year demonstrated that technology is not enough. Whether startups use hydroponics, aeroponics or aquaponics technology, the time has come to prove they can generate income, and eventually become profitable.

The situation is now more straightforward than it was a year ago, and startups are now betting their revenue streams either on:

- **B2C models**: startups who sell their production of microgreens, vegetables, strawberries, etc. directly to consumers through retailers, notably by betting on their brand power to compensate for the additional cost of their produce.
- **B2B models**: startups who develop farming systems and sell or lease them to larger companies, private commercial farms or academic institutions.

DIGITALFOODLAB IN ACTION

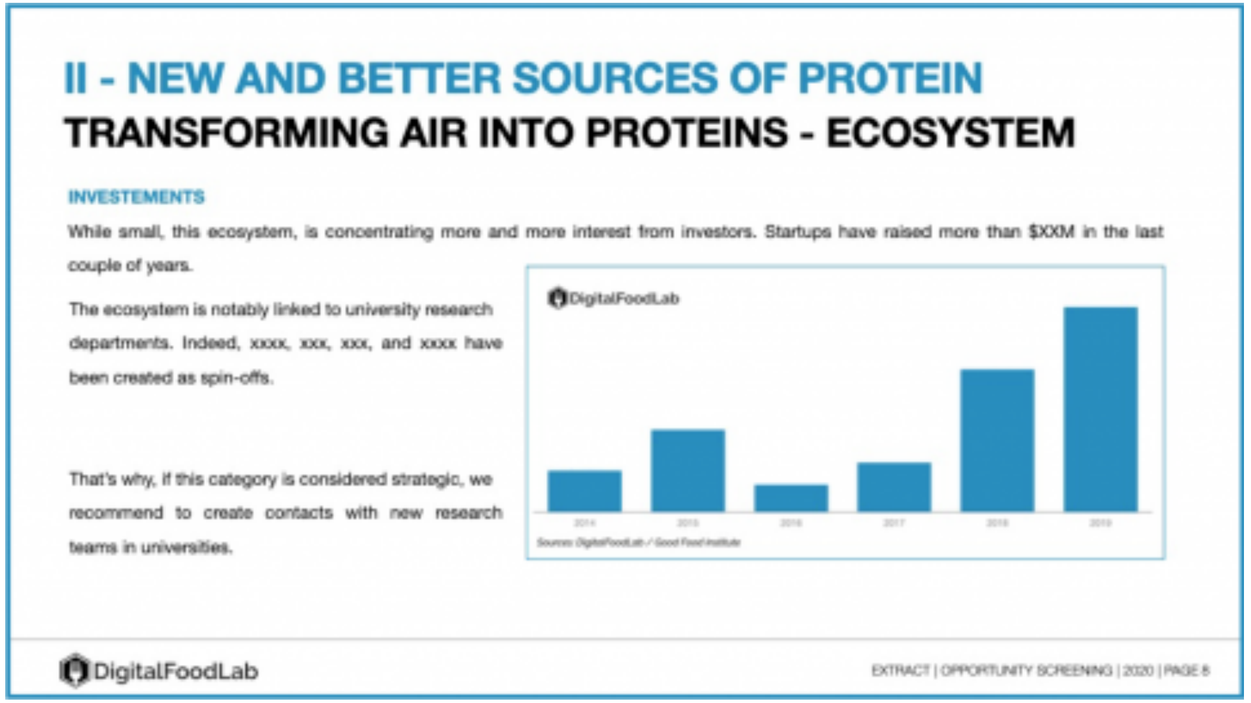
OPPORTUNITY SCREENING

In a month, we will identify 10 to 15 areas of innovation that we think you should consider.

For each, we will explain what it is, where it comes from, where it may go, and why we think it is an opportunity for you.

The goal is to give you an overview of all the areas of innovation that surround your business (or the category you want us to focus on).

CONTACT US



FOODTECH TRENDS IN 2021

MEGA TREND 3:

THE FUTURE OF RETAIL

With €950M raised in four years, Picnic is building the infrastructure to compete with incumbent retailers. Based on the idea of the "milkman delivery" (you know when the delivery will pass through your street during the week), it has been met with great success and is now expanding in Germany and France.

MEGA TREND #3: THE FUTURE OF RETAIL

WHAT IS THE TREND ABOUT?

The past couple of years have been really game changing. From wondering about the potential of food e-commerce, questions are now much more about:

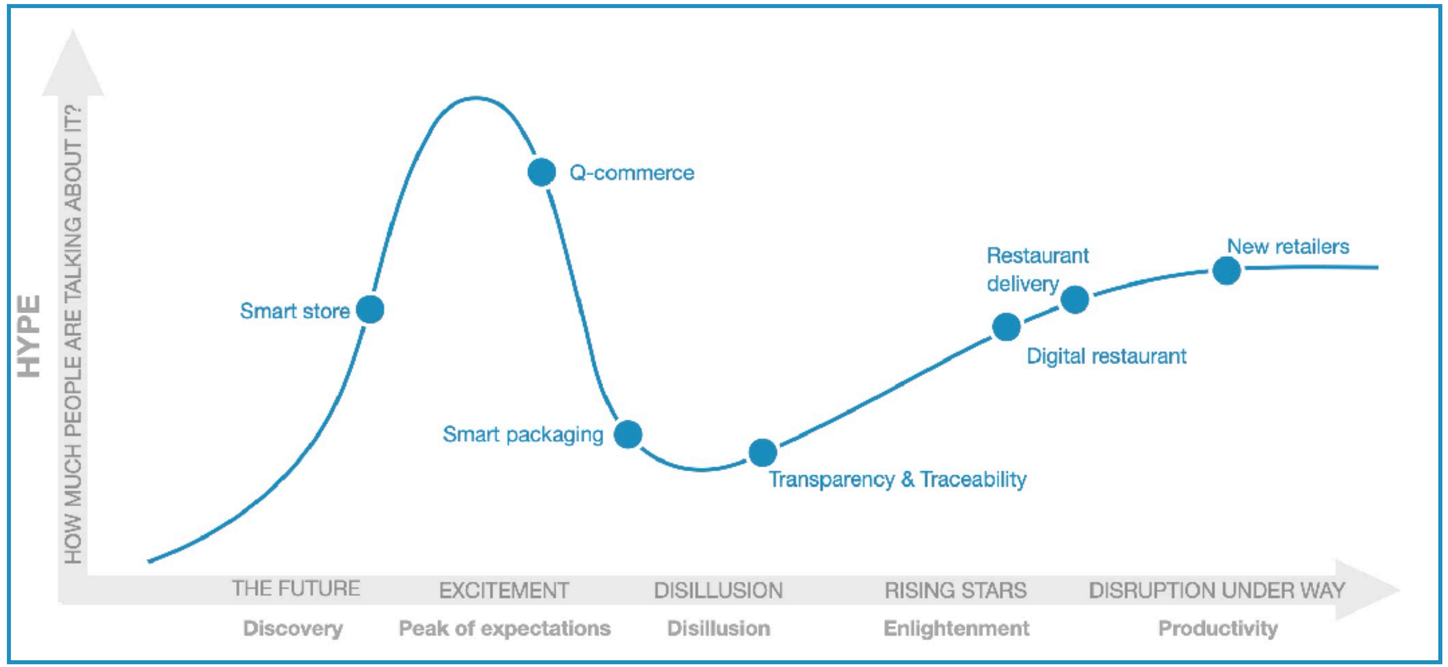
- What will the share of the food Ecommerce / delivery be?
- How fast and how far will it go?
- What will the grocery store and restaurant of the future be?

The pandemic has not only made consumers change their habits. It has also “revealed” to many investors and entrepreneurs that food retail was a massive and undisrupted business. They have launched and financed many new ventures that are now threatening the status quo and trying to reinvent the grocery store and the restaurant.

Finally, this trend should be combined with the “food automation trend” (next part of this report). Indeed in many cases, the new ventures that we are talking about are betting that warehouse, cooking or delivery automation will be available soon and make their business model (more) viable.

MEGA TREND #3: THE FUTURE OF RETAIL

HYPE CURVE



The traditional retail disruptors hype curve

We have identified on the hype curve 7 food disruptors that threaten the status quo in the food retail industry (in which we combine foodservice and the supermarket).

These ecosystems are interestingly spread all along the curve, some advanced and quite mature (such as the new retailers which are now “just” expanding their reach with profitable business models) and ecosystems such as the smart store and q-commerce far from reaching mass adoption and productivity. In the later case, we remind that each technology or ecosystem travels the curve at its own speed, some very fast, some ever stagnating at some point (and many collapsing in the desolation phase).

MEGA TREND #3: THE FUTURE OF RETAIL

WHO'S DOING WHAT?

This ecosystem can be divided into two groups: the startups that are actually reinventing how we access groceries and restaurant meals, and startups supporting them.

FROM 100% VIRTUAL TO FULLY INTEGRATED BUSINESS MODELS

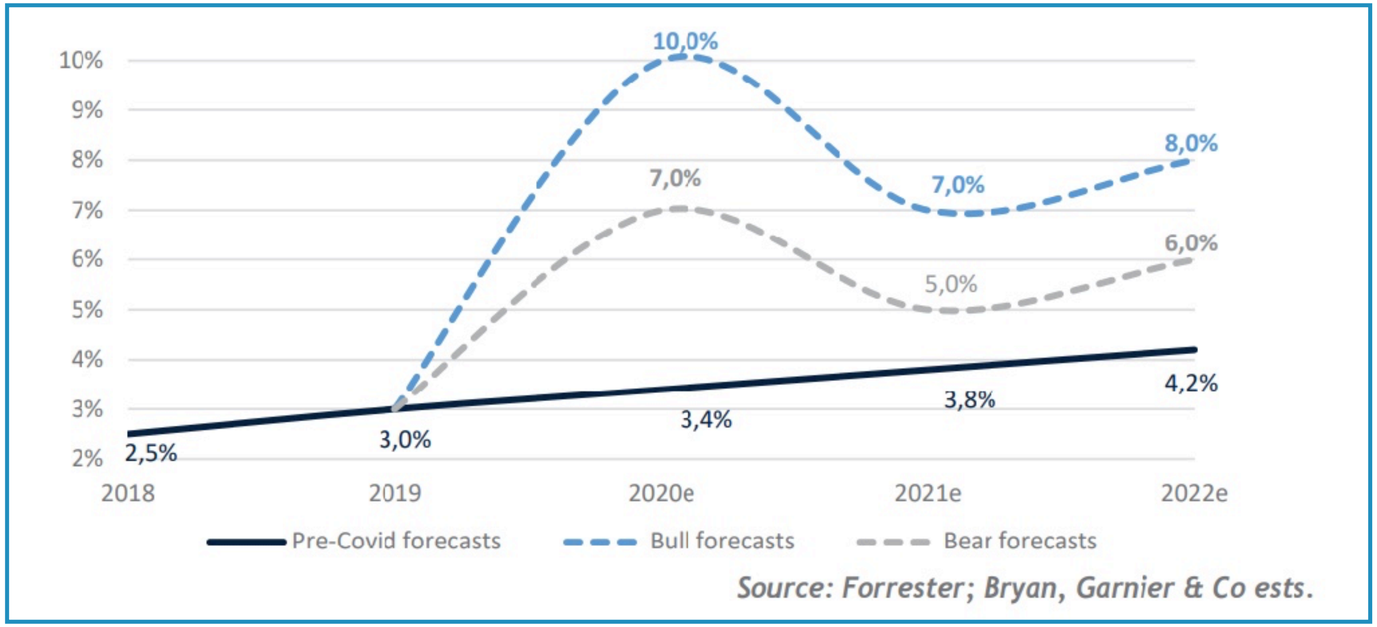
A good way to differentiate the various categories is according their level of integration. Some are fully virtual, such as Instacart-like companies. On the other hand, dark store startups are fully integrated (they own their stores and employ their drivers).

MEGA TREND #3: THE FUTURE OF RETAIL

THEN AND NOW: FOOD E-COMMERCE IS NOW REALLY “A THING”

THE NEW TRAJECTORY

Food e-commerce has been long to take off and the levels of penetration are very different from country to country (around 17-20% in China and South Korea, 8% in the UK and less than 1% in Germany). However, Covid has had a huge impact. The growth has been spectacular and the medium-term trajectory has been impacted with an expected growth significantly higher than what was previously projected.

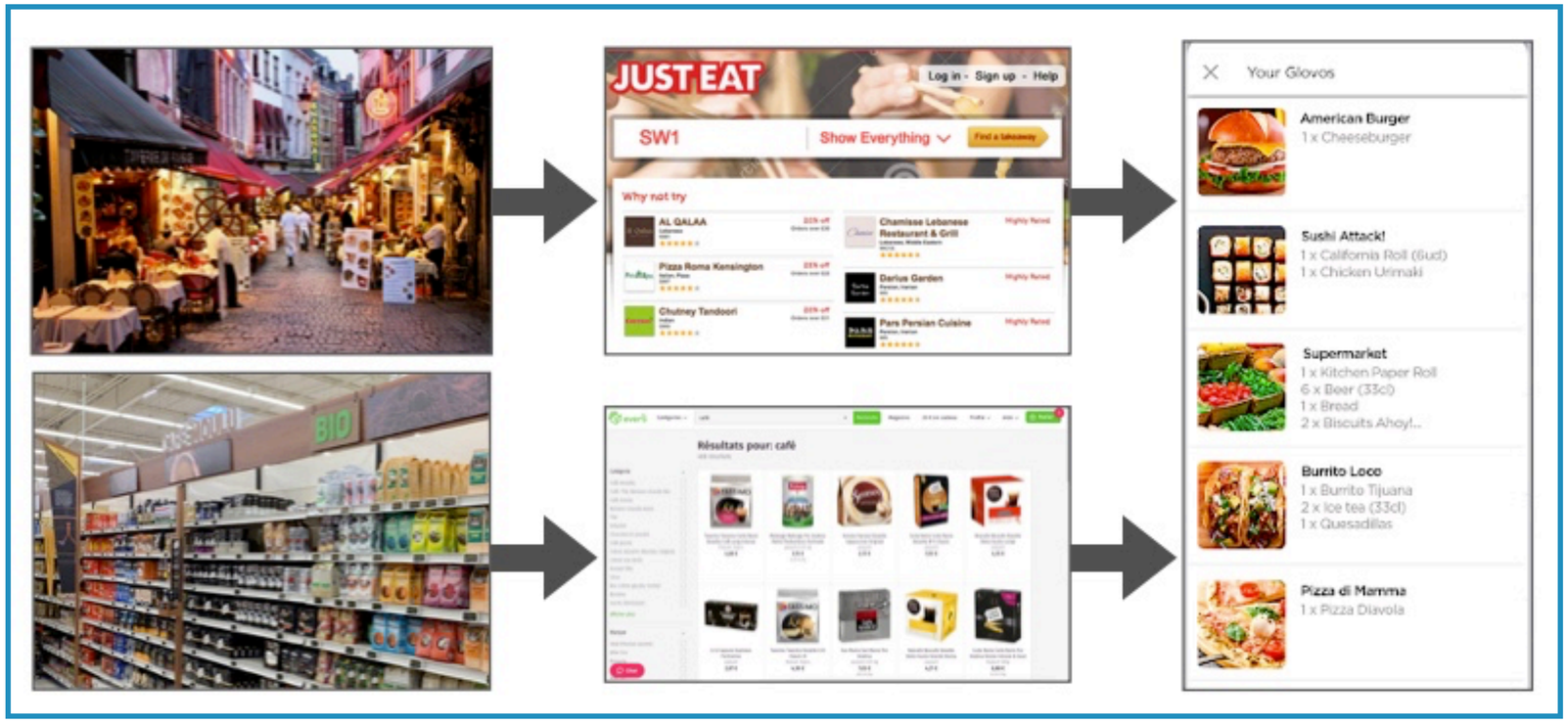


Global penetration rate of e-commerce in food

The question is now much less about the existence of the food e-commerce market but much more about “how to make profits on it” and “who will master it”. As traditional players have been reluctant to enter food e-commerce, the market is open to new players. One should keep in mind that in the US alone, the grocery market was above $750B in 2020. This explains the flood of investments in this space oriented toward startups that are looking to disrupt the grocery market.

MEGA TREND #3: THE FUTURE OF RETAIL

THE NEW RETAIL PARADIGM



We observe a shift from a paradigm of "wandering" in space (streets or supermarkets) to websites (for food delivery and food e-commerce) which were already curated and more and more organised with algorithms. With services combining both grocery and restaurant meal ordering in one app, the importance of what appears first is getting ever more important.

This explains the accelerating shift of food delivery companies from traditional business models (based on a fee) toward a model based on marketing (making your offering appear first) and data (selling data about consumers' habits and opportunities).

MEGA TREND #3: THE FUTURE OF RETAIL

THE NEW RETAILERS

The new retailers are the startups that are looking to rebuild the infrastructure of a traditional retailer with a focus on e-commerce. Starting from scratch, they are able to use the new tools that traditional retailers have a hard time adopting. It means both software (how the supply chain is managed) and hardware (unified fleet of (often electric) vehicles, modern warehouses, etc.). In a word, they combine the best of both worlds: they are operated as startups but with the ambition and knowledge of a century of mass retail. This combination attracts a lot of investments, notably in Europe with a new generation of players that is able to make a dent in the market by growing food e-commerce sales in their markets and then by taking significant shares. Among the most notable players are:

- Picnic in the Netherlands (founded in 2015, $1B raised) which now has around 20% of grocery e-commerce in its home market and is expanding in new countries.
- Kolonial / Oda (2013, $378M), born in Norway leads grocery e-commerce there and is now expanding in new markets
- Rohlik (2014, $402M), born in The Czech Republic and now expanding fast in new countries.

It will be interesting to see how these three startups compete in their expansion. They will notably meet face to face in Germany in 2022.

MEGA TREND #3: THE FUTURE OF RETAIL

RESTAURANT DELIVERY

THE DECISIVE QUESTION: OWNING YOUR DELIVERY OR BEING A MARKETPLACE

We can read this ecosystem as an evolution from platforms such as Just Eat / Takeaway. They were marketplaces connecting consumers to restaurants operating their own deliveries whereas today there are new services which also MANAGE the delivery (such as Deliveroo). While both types of platforms now do both, the distribution of the activities is not the same (70/30 versus 30/70).

Operating a "mere marketplace" by partnering with restaurants that master their deliveries (and integrate them in their costs and pricing) **is much more profitable than also managing the deliveries**. Hence, we can wonder what the future of this ecosystem is, at least in terms of delivery integration, notably as more and more governments are putting restrictions on the ability to use independent workers.

MEGA TREND #3: THE FUTURE OF RETAIL

RESTAURANT DELIVERY

THE MOVE TOWARD GROCERIES & THE NEED FOR PROFITABILITY

As all major players are now public companies (with some exceptions inert India, but that should change soon). This means that while they have gathered large financial resources during their IPOs, they now have to communicate their data each quarter and showcase a clear path toward profitability.

It seems that for most of them (DoorDash, Delivery Hero, Deliveroo…), this path will start with dark stores.

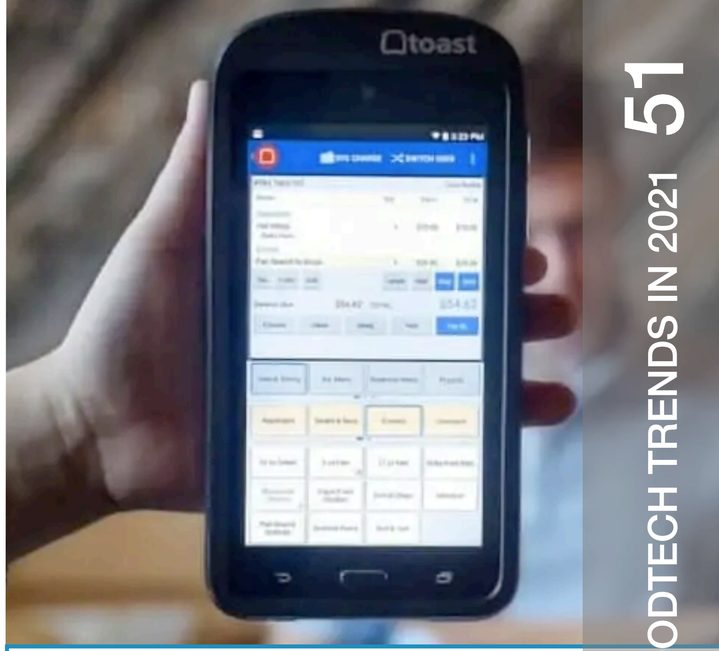
As policymakers, notably in the US, are putting caps on the fees the platforms can ask from the restaurants, **these startups are now developing new marketing services**. Marketing your restaurant or products will become a more important part of their business model in the coming years.

AUTOMATION: WHEN?

To improve their margins, many of the integrated platforms are thinking about automating their deliveries (as well as doing some of the cooking in their dark kitchens). This is promising but still far away (see next part on food automation).

MEGA TREND #3: THE FUTURE OF RETAIL

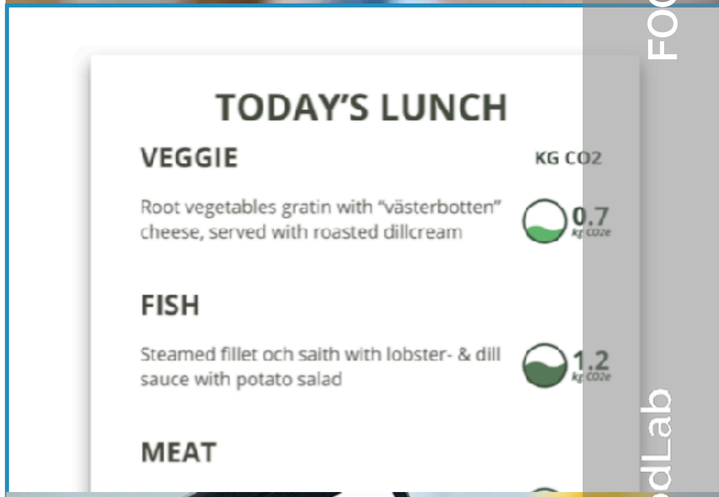
THE DIGITAL RESTAURANT

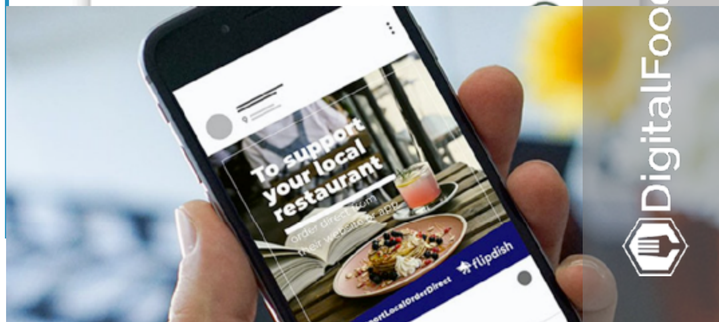


2020 has been a hard year for the foodservice industry. And startups working in this space, notably those who are working toward a more digital restaurant have also had a hard time. However, this period may turn out to have been a boon for them in the long term. Indeed, never before has a period shown so dramatically how important it was for a restaurant to be agile in its operations, from being able to move to delivery platforms to being able to manage contactless payments when restaurants reopened. With the IPO of Toast, the foodservice ecosystem is breathing again. **We can observe a surge of funding in payment services, order management and other apps** (from HR to sustainability).

THE NEW PROCUREMENT: VIRTUAL OR INTEGRATED

Beyond the restaurant itself, a new area is attracting most of the attention: **procurement**. From online marketplaces such as Choco to integrated disruptors such as Cheetah, the space is crowded with new ventures that are looking to change the way restaurant owners source their ingredients and establish relationships with producers. As many restaurants have changed hands and the new generation of owners is more and more looking to manage restaurants as digital companies, we can expect this ecosystem to boom in the coming years.

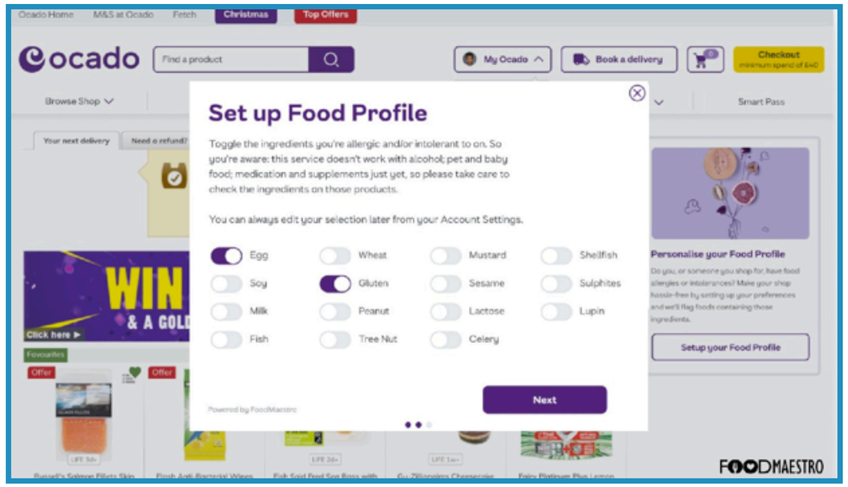




MEGA TREND #3: THE FUTURE OF RETAIL

TRANSPARENCY & TRACEABILITY

From a grand vision of services that would be able to track food from farm to fork using blockchain, the transparency & traceability ecosystem is now much more “practical”. Indeed, few companies are still competing in the space of end-to-end supply chain tracking (we can mention Te-Food and Provenance). Others are now addressing food and retail busines challenges such as compliance (Connecting Food), quality control, or sustainability (How Good). On the consumer side, even if many apps and services have been launched to help the consumer make more conscious choices, these have until now failed to create viable business models.



While many apps have been launched in the past couple of years in the scoring and coaching space, very few have had any significant impact. For us, this space has definitely moved toward a B2B business model with services such as Innit and Food Maestro.

MEGA TREND #3: THE FUTURE OF RETAIL

SMART PACKAGING

Smart packaging refers to solutions enabling the **reduction of food waste while improving product shelf-life** as well as promoting a clean way to create packaging, with less plastic and more biodegradable or compostable elements.

On the second point, there have been startups working in this field for a while, with a wide range of solutions. They offer biodegradable packaging solutions (like Lactips' plastic-free polymer) or even compostable ones (see Tipa, the Israeli startup which developed a blended solution from plant and petroleum elements which decomposes under compost conditions).

However, the real disruption in the packaging world may come from solutions without packaging at all. With protective layers applied on fresh products (fruits, vegetables, but also meat or fish), or sensors in containers, some companies are reducing food waste and improving product shelf-life as well as reducing food costs.

Among the most notable players to watch, we can mention:

- Apeel, a California-based startup, which adds a layer on the surface of fruits and vegetables. This helps keep moisture in and oxygen out, which means produce lasts twice as long. It recently raised $250M at a $2B valuation.
- Innoscentia, a Swedish startup which, has developed sensors that indicate the growth of bacteria in meat.

MEGA TREND #3: THE FUTURE OF RETAIL

Q-COMMERCE

In a word, **quick-commerce is about delivering grocery items in less than 10 or 15 minutes** (in Europe, that is; in the US, it is more like 30 minutes). Companies operate their own small warehouses (dark stores) inside city centres and employ the people who deliver the groceries (in opposition to the gig-economy workers of restaurant delivery platforms).

Quick-commerce startups have really emerged during the pandemic and in its aftermath. However, the concept is not that new. Leaders in that space have been active for some time. GoPuff, the US leader, was founded in 2013. However, it raised the majority of the staggering $3.4B it has received in funding in the 12 months after the first wave of Covid. Similarly, Getir was founded in 2015 and has only expanded outside of Turkey in the past year.

Players in this space are showing incredible operational capabilities. They open in new countries and new cities at an incredible speed. Many boost their ability to grow fast in order to attract new money from investors. Startups have been acquired only a few months after having started their operations (notably Dija which had raised $20M before launching and was acquired by GoPuff in 6 months) while others are already rumoured to be out of cash and close to stopping their operations.

MEGA TREND #3: THE FUTURE OF RETAIL

Q-COMMERCE

Then it is not a surprise that many wonder if these companies may be able to break even at some point. **The key figure to follow here seems to be the number of average daily orders a store needs to be profitable**. It fluctuates widely from country to country and from startup to startup. While some stores from Getir are profitable in Istanbul and many Delivery Hero stores have also reached profitability in developing economies, can companies pass the bar in cities like New York, London, Paris and Berlin (where the competition seems to concentrate on a high number of players)? Indeed, in these cities, employees and good locations are both more expensive and harder to get.

In the longer term, these startups will face a set of existential questions that may break them or at least help them to differentiate:

- Today, quick-commerce companies are leaner than traditional (or even new) retailers as they don't operate large warehouses and count on foodservice or retail partners to deliver the items to their stores. However, as they look to improve their margins by negotiating directly with brands, they may need to create their own logistics.
- A key component of their business model could be to deliver more marketing data and insights to brands (as for restaurant delivery startups). This reopens the question of being large enough to provide relevant data and independent enough from traditional retailers.
- Another path could be to move toward private labels as some companies are already doing (for example Frichti). This requires a very strong brand and may alienate the relationship with big brands and hence the aforementioned business model extensions.

MEGA TREND #3: THE FUTURE OF RETAIL

SMART STORE

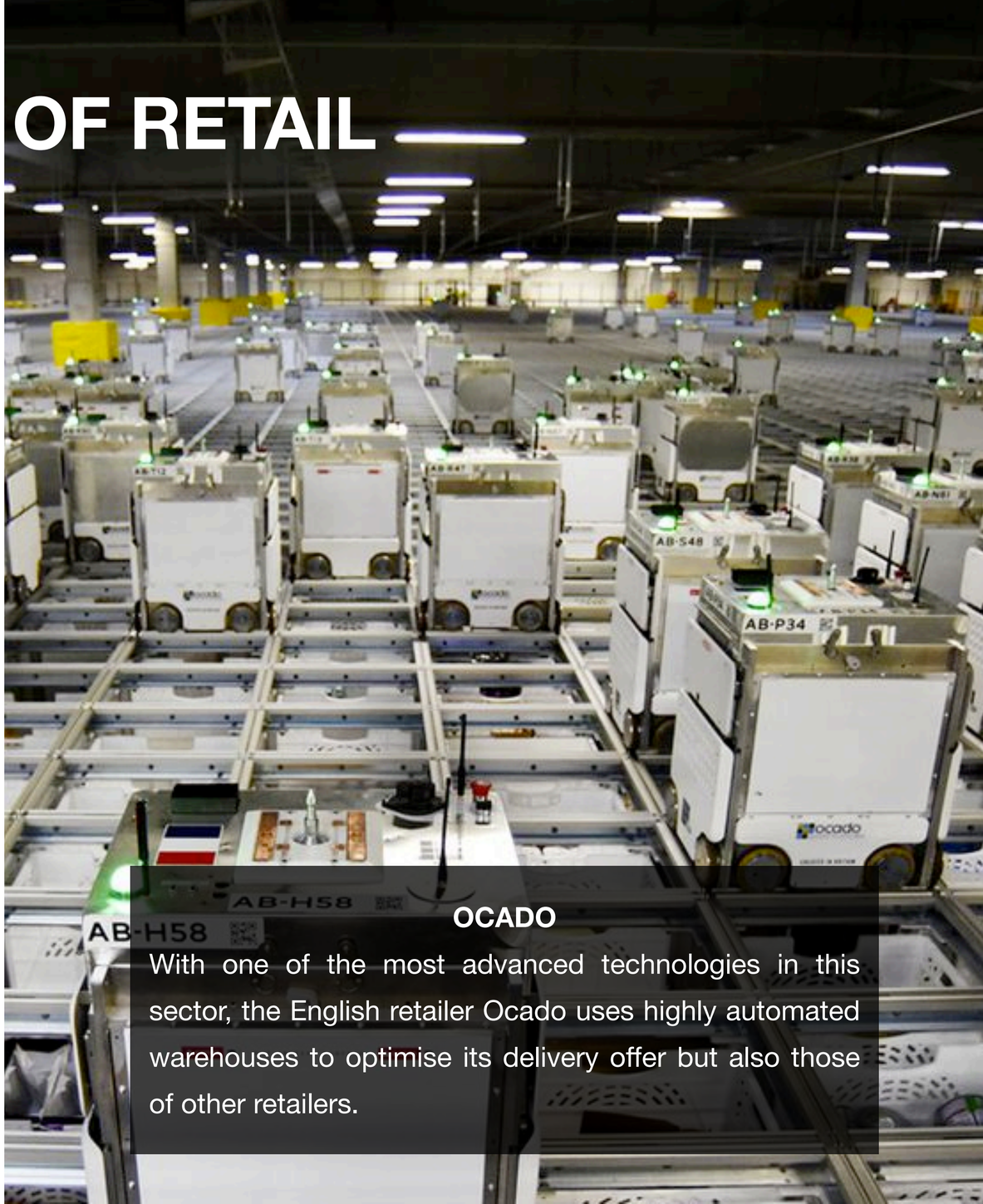
From warehouse to store, the retail area is becoming more and more autonomous and “smart”. Robots and technology are used to help brands, suppliers and retailers offer the best experience to the consumer.

WAREHOUSE AUTOMATION

In order to answer the increasing demand for grocery deliveries, (new and old) retailers have to improve and strengthen their order-picking capabilities. Warehouses are also becoming more and more automated, and the new ones are based on robotics platforms such as the Ocado warehouses (see opposite).

IN-STORE ANALYTICS

We use “in-store analytics” to refer to various technologies capable of offering in-store visual monitoring of CPG products, and can help retailers optimise product placement and marketing decisions.



OCADO

With one of the most advanced technologies in this sector, the English retailer Ocado uses highly automated warehouses to optimise its delivery offer but also those of other retailers.

MEGA TREND #3: THE FUTURE OF RETAIL

SMART STORE

From out-of-stock detection to real-time pricing, technologies help the store's staff to manage their stocks and labour hours.

In this area, the Singapore-based startup Trax is one of the most financed startups (with a $650M round in 2021).

THE "AMAZON GO" TECHNOLOGY

Everyone is aware of the Amazon Go concept store, the "no lines, no checkout" store where the customer has just to identify himself with its phone, pick some products and leave. Some startups are working on similar cashier-free solutions, combining cameras and AI systems:

- Standard Cognition (US), which raised $150M in February 21, provides AI-powered tech for retailers to automate the check-out process.
- AiFi, also US-based, aims to deploy cashier-less technology in grocery stores and also its own portable and AI-powered store.
- Trigo, an Israeli startup which has already raised $100M, deploys a similar solution.

DIGITALFOODLAB IN ACTION

DEEP DIVES

When we dive into an ecosystem, our first step is to map it. The goal is to identify:

- The various sub-categories and how they interact;
- The past and current trends making up this ecosystem;
- The leaders (startups and corporations) of each segment.


PROTEINES ALTERNATIVES

0-2 ans | FR EU

STARTUPS SELECTIONNÉES LORS DU PROTEIN SUMMIT (LILLE) : BEAUCOUP DE PLANT-BASED STARTUPS PROCHES DU MARCHÉ

ROBOTS LIVREURS

5-10 ans | US UK

STARSHIP TECHNOLOGIES LÈVE DES FONDS POUR ACCÉLÉRER SES EXPÉRIMENTATIONS AVEC DES GRANDS GROUPES

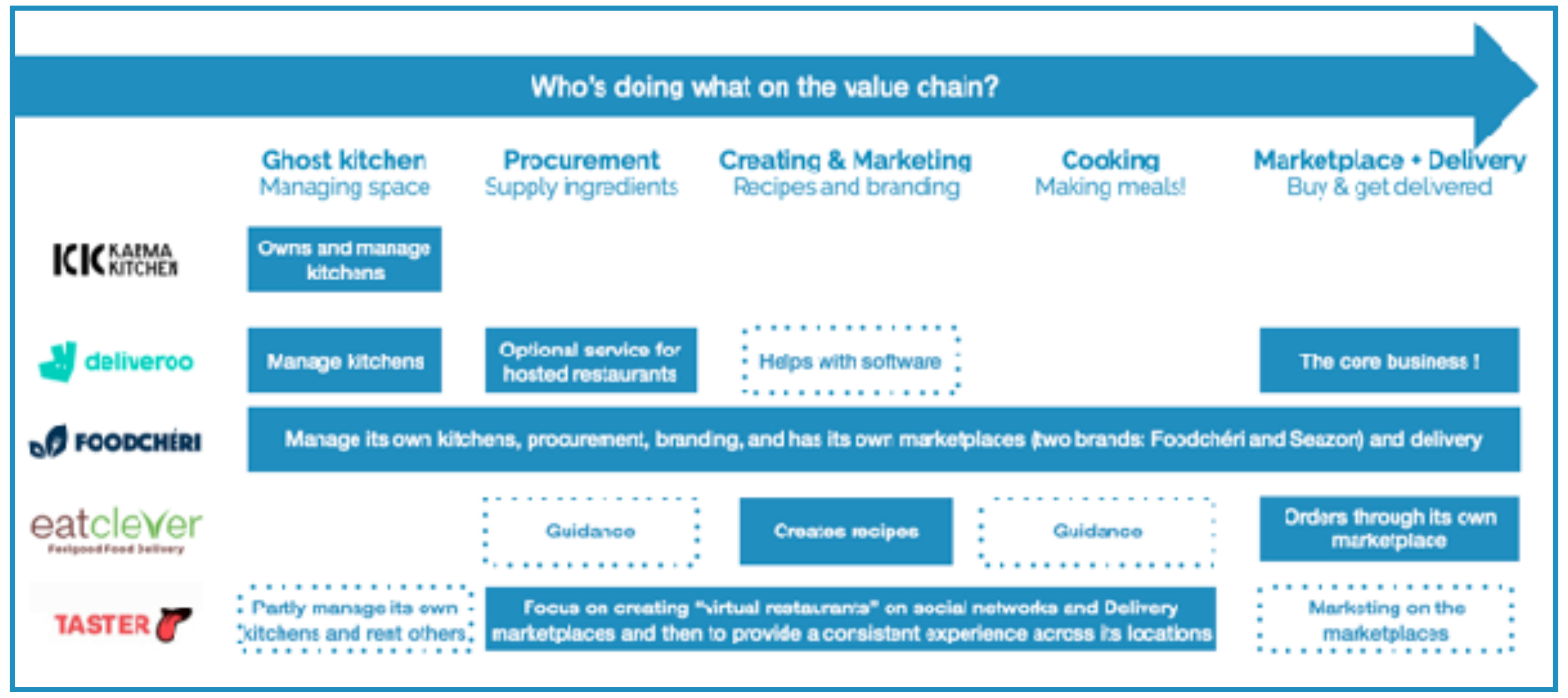
ACTUALITÉ : Starship Technologies, une startup européenne (UK, Estonie) spécialisée dans les robots livreurs, a annoncé une levée de fonds pour accélérer son développement. La startup a déjà réalisé plus de 100.000 livraisons sur des universités américains, en partenariat avec de grands groupes et veut se développer sur ce marché avant de toucher les livraisons de plats "dans la ville".

POURQUOI C'EST IMPORTANT :

- Les robots livreurs ne sont pas près (techniquement et en terme d'acceptation sociale) d'envahir nos rues.
- La livraison du dernier kilomètre est le point le plus sensible, à la fois financièrement et en terme de qualité / expérience, pour les startups du domaine. Les robots pourraient être une solution à ces problèmes.

Lien : Venture Beat (EN)

Exemples actualites veille FoodTech - DigitalFoodLab - confidentiel - novembre 2019 #4



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FOODTECH TRENDS IN 2021

MEGA TREND 4:

FOOD AUTOMATION

Moley robotics is a UK-based startup that has made a lot of noise in the past couple of years with its at-home kitchen robotic technology. It has launched a set of robotic arms which can cook up to 5,000 recipes at a restaurant-quality level.

MEGA TREND #4: FOOD AUTOMATION

WHAT IS THE TREND ABOUT?

As mentioned in the mega trend #3 about the future of retail, a key component of the future success or failure of restaurant delivery platforms and quick commerce operations will be their ability to automate both orders (cooked meals and groceries) and delivery.

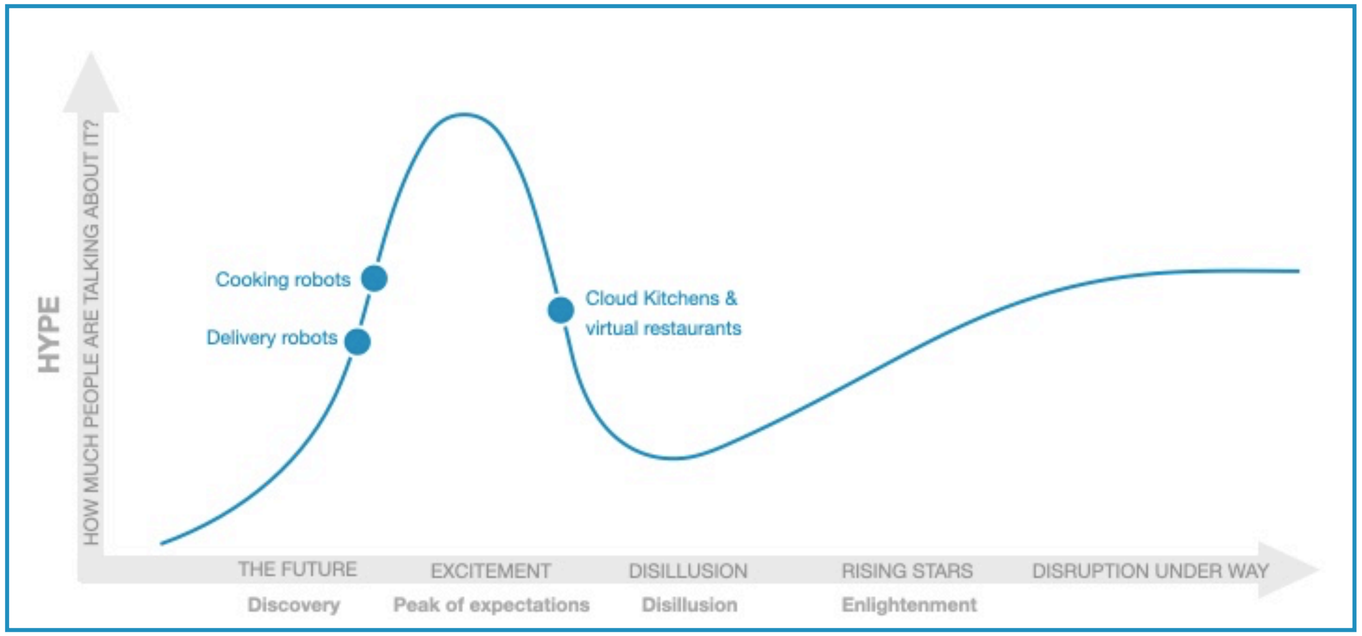
Basically, they have a limited number of costs:

- **Internal operations** which will also be hard to optimise.
- **Supplies** (raw ingredients, cooked meals from restaurants or grocery items bought from suppliers). To reduce the price here they will have to develop their own private label brands for quick commerce or switch to cloud kitchens and virtual restaurants for restaurant delivery.
- **Deliveries** which could be automated.

It is the automation of these two last points that is the focus of this mega trend. The use of robots, drones and AI could massively change the way these businesses are run and make them much more profitable.

MEGA TREND #4: FOOD AUTOMATION

THE HYPE CURVE



The food automation hype curve

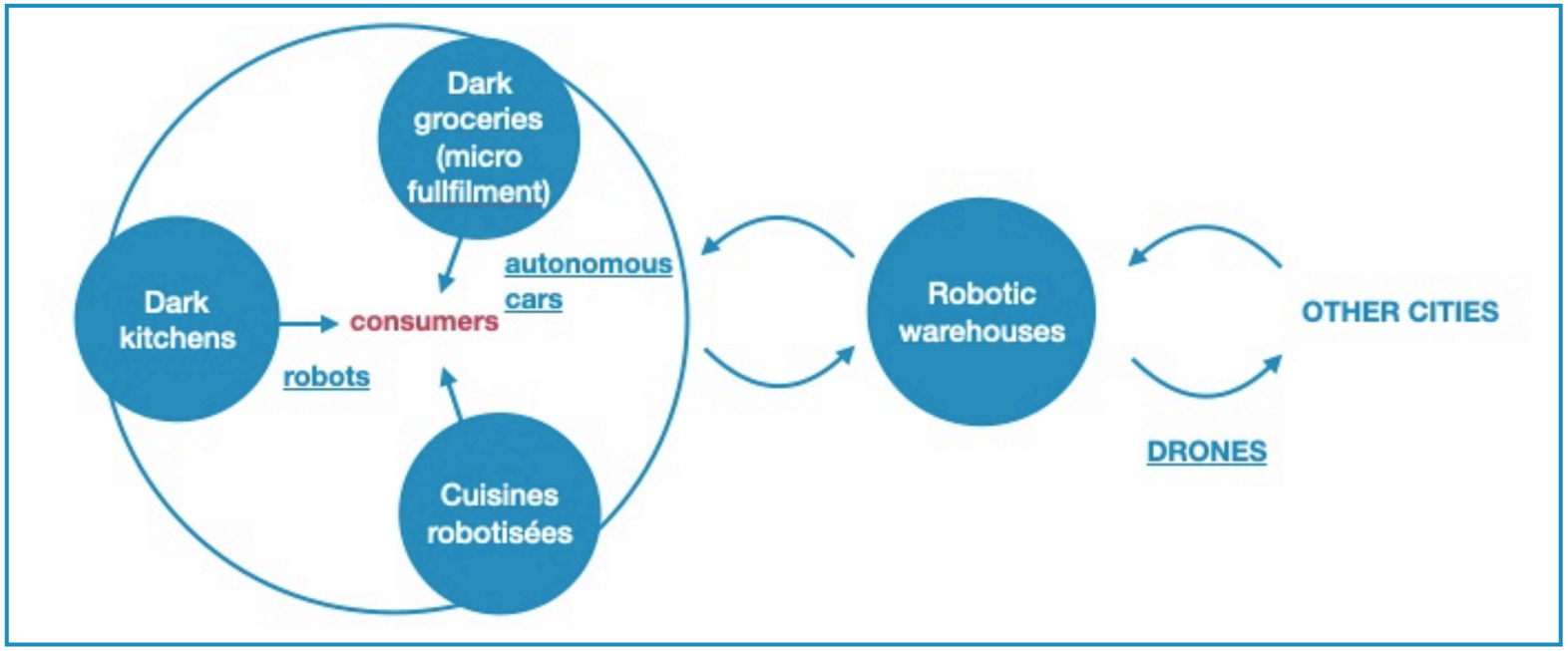
As shown on the opposite graph, this trend is a long term one as most of its components are on the upstream part of the hype curve.

- While cloud kitchens and virtual restaurants are now commonplace, **their business model is still unclear** with companies still launching and failing fast in this space. We can expect a reckoning in the coming months. After that, we can hope for a renewed focus on this space in the next couple of years when the “right” business model and specialisation will have emerged.
- Cooking and delivery robots ("robot" in a broad sense, as seen on the next page) are still far away . While numerous experiments are ongoing, they are limited in their scope. However, their deployment could be hastened, notably in the delivery space.

MEGA TREND #4: FOOD AUTOMATION

CAN FOOD BE 100% AUTOMATED?

We can imagine a near future with many of the components of the downstream food value chain featuring some level of automation, from warehouses to delivery and kitchens. However, there is a big jump from there to a situation 100% automated and integrated.



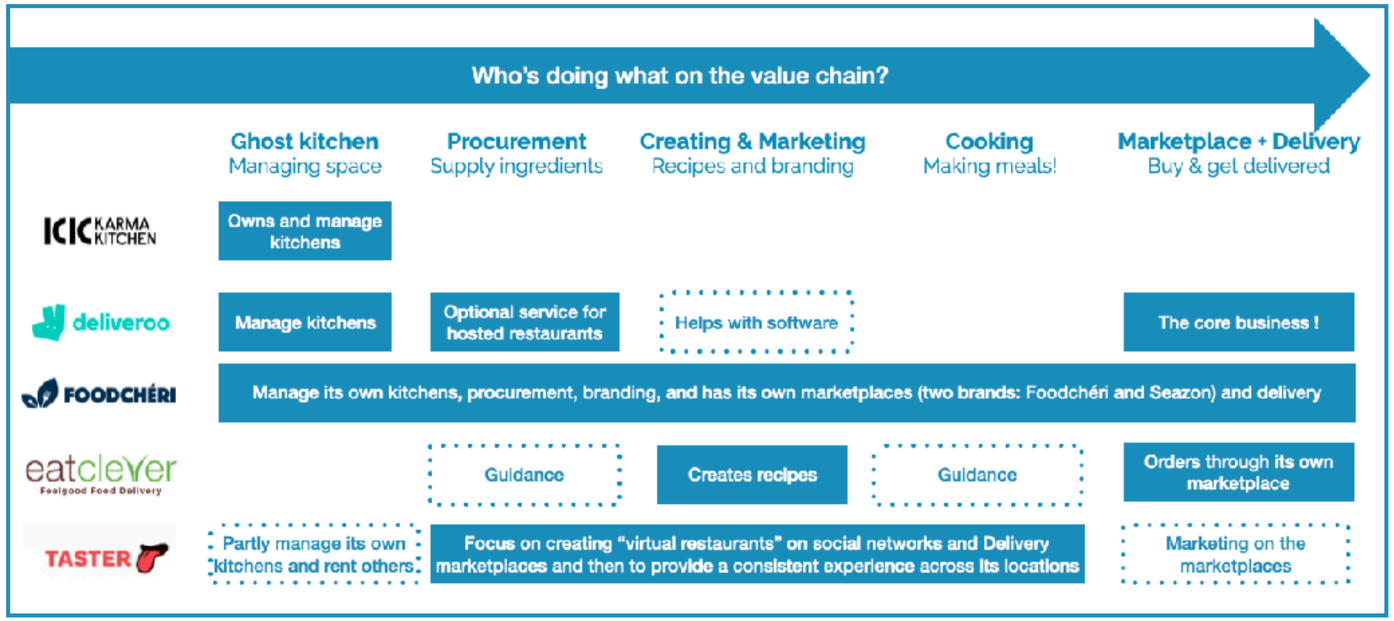
It could be a situation where warehouses are automatically connected to small micro-fulfilment dark stores inside cities by drones or autonomous cars. And then, deliveries to cloud kitchens or to the final consumer are made by robots. However, this level of integration seems to be prohibitively expensive for the foreseeable future.

The question seems to be much more about the degree to which each individual segment of this chain will be automated. Even if we can't expect a full automation of the food value chain, the level will be much higher than what we now have.

MEGA TREND #4: FOOD AUTOMATION

CLOUD KITCHENS & VIRTUAL RESTAURANTS

This ecosystem may be one of the most exciting to look at right now. Normally, when an ecosystem starts to grow this fast, it is when it has reached a level of “convergence”. It means that from all the various business models existing in its early days, only one or a limited number are still attracting money and are considered as winners. It is not the case here: **startups are operating very different models** which can often be confusing.



Cloud, dark, ghost or virtual?

- **A cloud, dark or ghost kitchen is mostly a space operator**. It manages modular kitchens that will then be rented to other companies.
- **A virtual restaurant** is first and foremost a marketing expert that **creates restaurant brands**, menus and marketing material. These restaurants are only operated online through delivery platforms.

MEGA TREND #4: FOOD AUTOMATION

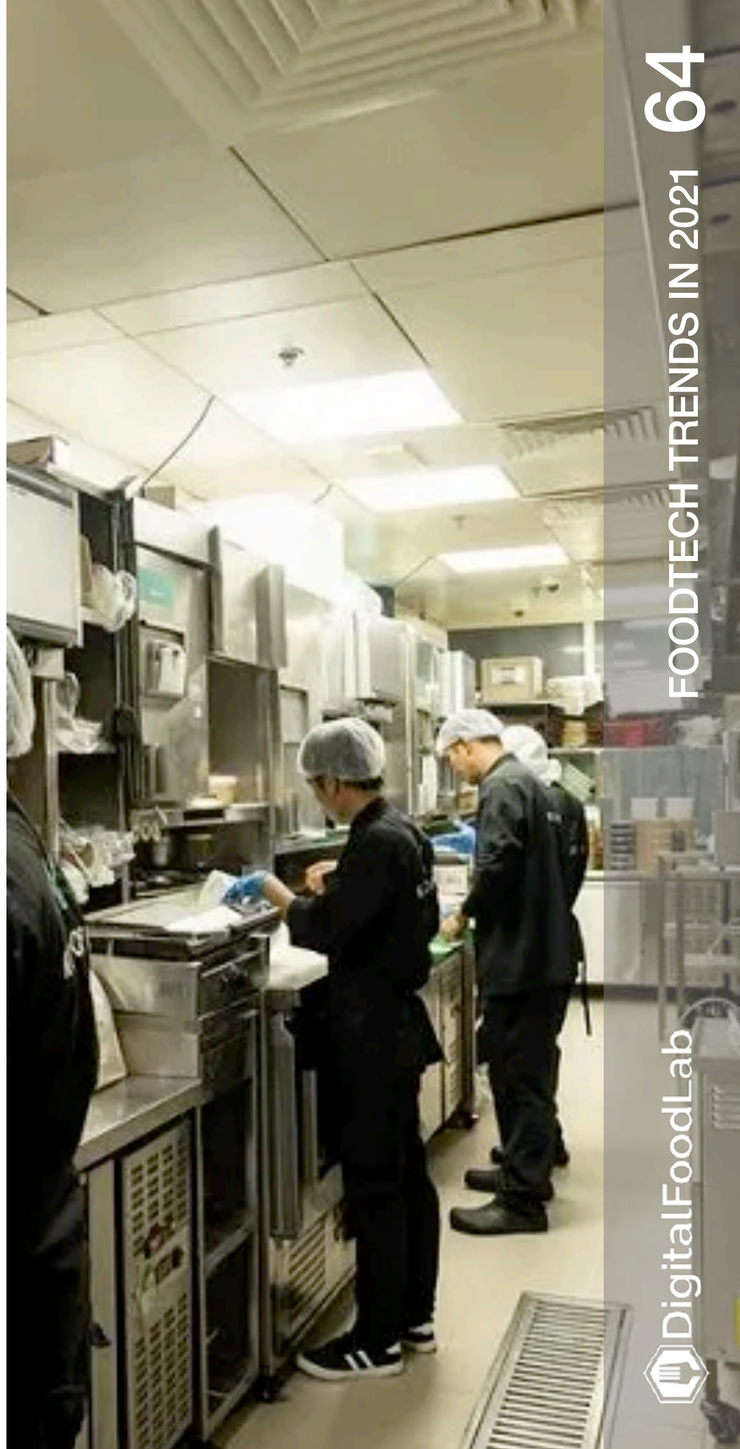
CLOUD KITCHENS & VIRTUAL RESTAURANTS

From integration to virtualisation

It is interesting to remember that initially, virtual restaurants and cloud kitchens were talked about as “Fullstack delivery” companies. The most famous, Munchery raised $125 between 2013 and 2015 (a huge amount at the time) before shutting down. These startups were managing both dark kitchens and delivery through their branded online platforms.

From this fully integrated business model, we are now observing more and more specialised players. Even virtual restaurants, which were mostly brand creators and operators (by employing cooks in others’ cloud kitchens), are becoming more virtual as they franchise their brands. Things could move even further:

- Some startups create brands that are “cooked” inside “real” restaurants (separate from their own menu)
- Others, such as Kitopi, operate “real” restaurant chains’ brands in their cloud kitchens with their own staff, marketing, etc.



MEGA TREND #4: FOOD AUTOMATION

DELIVERY ROBOTS

The robotic delivery ecosystem has been boosted by the pandemic and the labor shortage in its aftermath. The two main criteria for understanding this ecosystem are:

- **Where robots circulate**: on the sidewalk (small robots such as Starship Technologies'), on the road (autonomous cars' Nuro) and in the air (drones such as Manna's).
- **The level of autonomy**: some of these vehicles are fully autonomous while others are teleoperated (such as those of Coco, a small-robot company)

The last point is key. **It seems that this space has been slowed down by its willingness to reach full autonomy.** The use of teleoperator or partial autonomy can provide immediate upside over car deliveries (notably in the case of drones if it is able to reach its destination faster).

From small experiments before the pandemic, we now observe larger scale deployments. It is notably the case of Nuro which has raised more than $1.5B, notably from SoftBank's Vision Fund. The startup is now building its first production facility and keeps deploying its vehicles for delivery operations with companies such as Kroger and Domino's. Drones have also been used to quciken deliveries from cloud kitchens to dispatch zones where human riders will then take them to their final destination.

MEGA TREND #4: FOOD AUTOMATION

COOKING ROBOTS

As with delivery, cooking robots are often mixed together. However, this rich ecosystem is made up of very different technologies. It can be understood using the following criteria:

- **Robotic versus mechanical**: many “cooking robots” are more about mechanics. Automated kiosks such as those of Chowbotics don’t use complicated robotic technologies and hence have limited IP.
- **Versatility**: some cooking robots such as Moley’s can cook a wide range of meals while others perform very limited tasks (such as rotating tubes to deliver amounts of foods inside a salad bowl)
- **Fully integrated versus collaborative**: while many startups envision robots that cook a meal (often pizzas) from start to end, others focus on single tasks. These can then can be integrated inside existing restaurants (as Miso Robotics’ robotic arms).

This space is still nascent but it attracts a lot of interest form restaurant chains (Spyce was recently acquired by Sweetgreen) and from restaurant delivery companies (Chowbotics was acquired by DoorDash).

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REPORTS, INSIGHTS, DATABASE & NEWSLETTERS

Our yearly report on the European FoodTech ecosystem (sponsored by Nestlé & Google)

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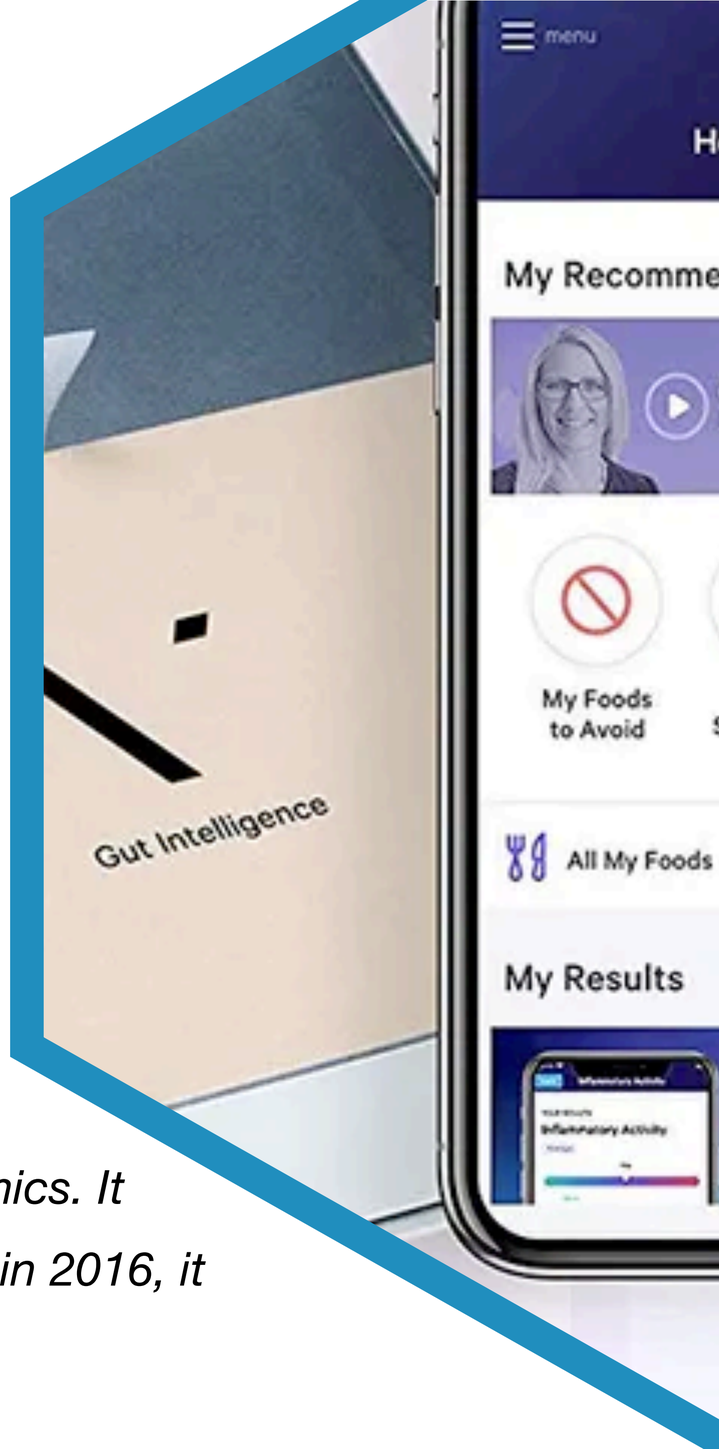
FOODTECH TRENDS IN 2021

MEGA TREND 5: PERSONALISED FOOD



Viome is one of the leading companies in the space of nutrigenomics. It sells microbiome tests and personalised food supplements. Born in 2016, it has raised $48M.

MEGA TREND #5: PERSONALISED FOOD

WHAT IS THE TREND ABOUT?

One of the common goals of food entrepreneurs is to provide foods that are “better for you”, which often means foods that are personalised to your needs. But, until now the biggest challenge remains: discovering what these needs. Indeed, we can identify **3 levels of personalisation**:

- **Level 1**: getting to know **the broad needs of any individual** - what are his/her needs in terms of macronutrients (proteins, fats, carbs) and which food are to be avoided.

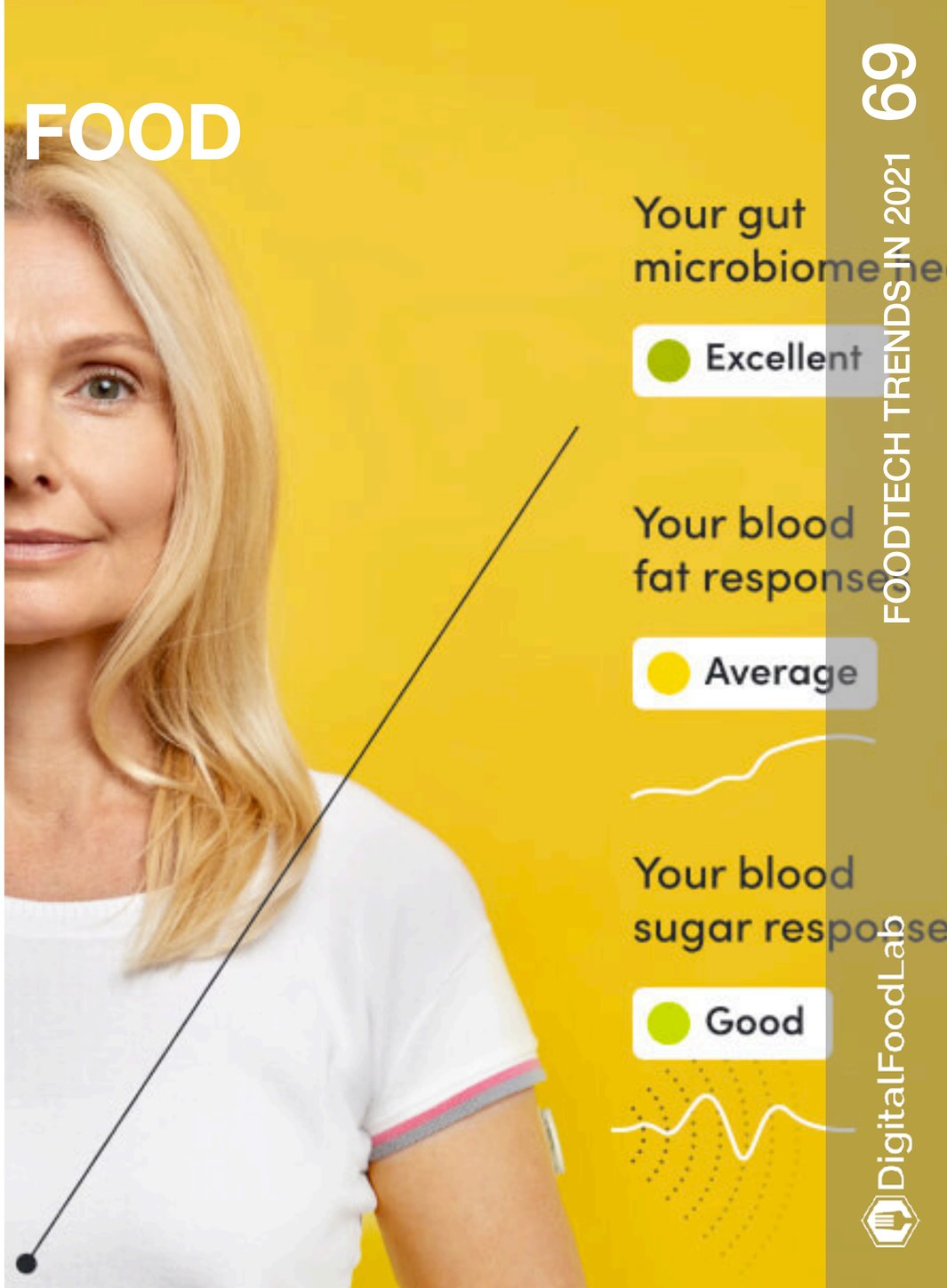
  => transforming this knowledge into action with products targeted at categories of consumers, nutraceuticals, etc.

- **Level 2**: getting to know **the specific needs** in terms of micronutrients, the predisposition to certain illnesses, the specifics of digestion (how well di you process any given ingredient?)

  => coaching apps, personalised food supplements

- **Level 3**: making the previous data **adaptable** to the environment (your daily activity and intakes)

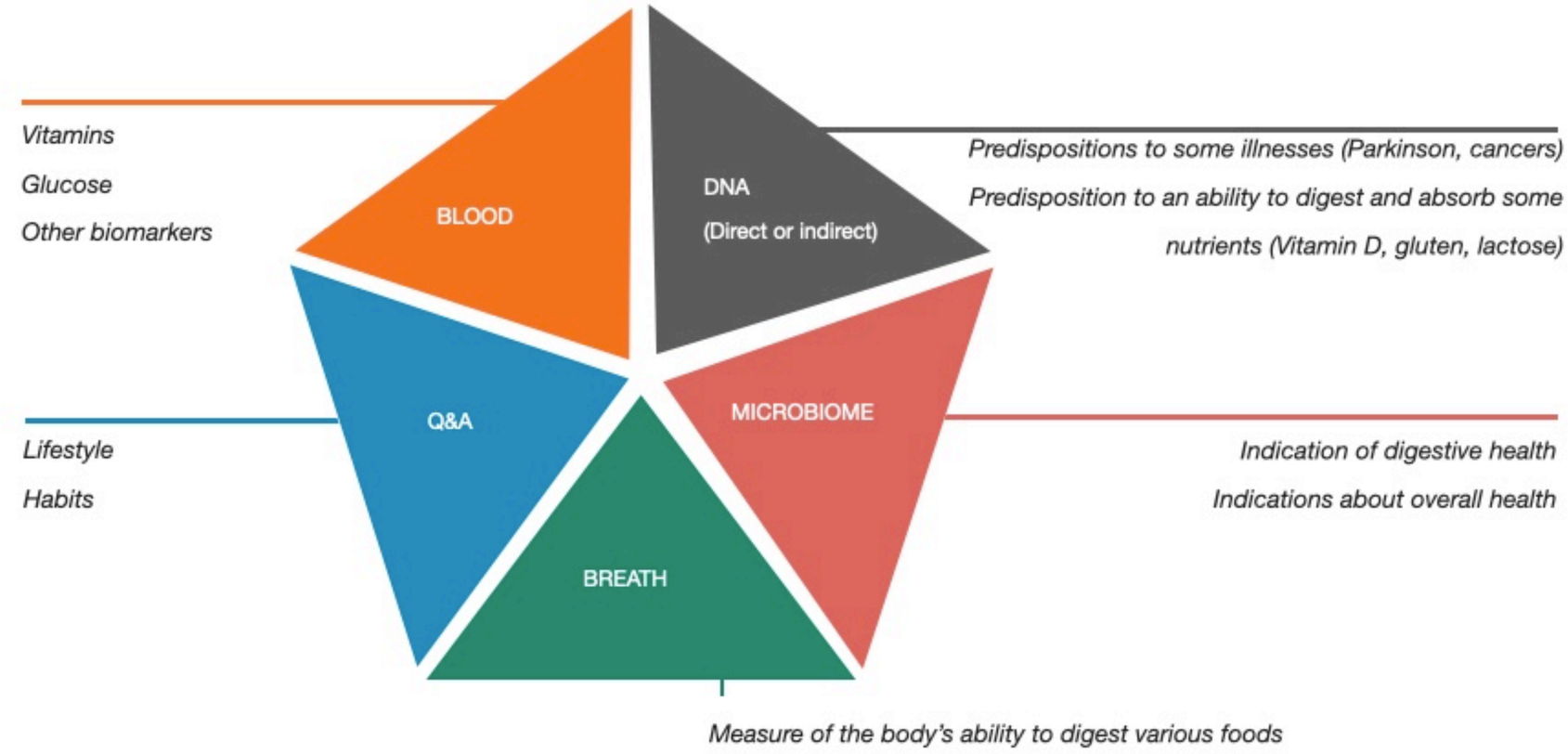
  => personalised food



MEGA TREND #5: PERSONALISED FOOD

KNOWLEDGE (ABOUT YOURSELF) IS POWER

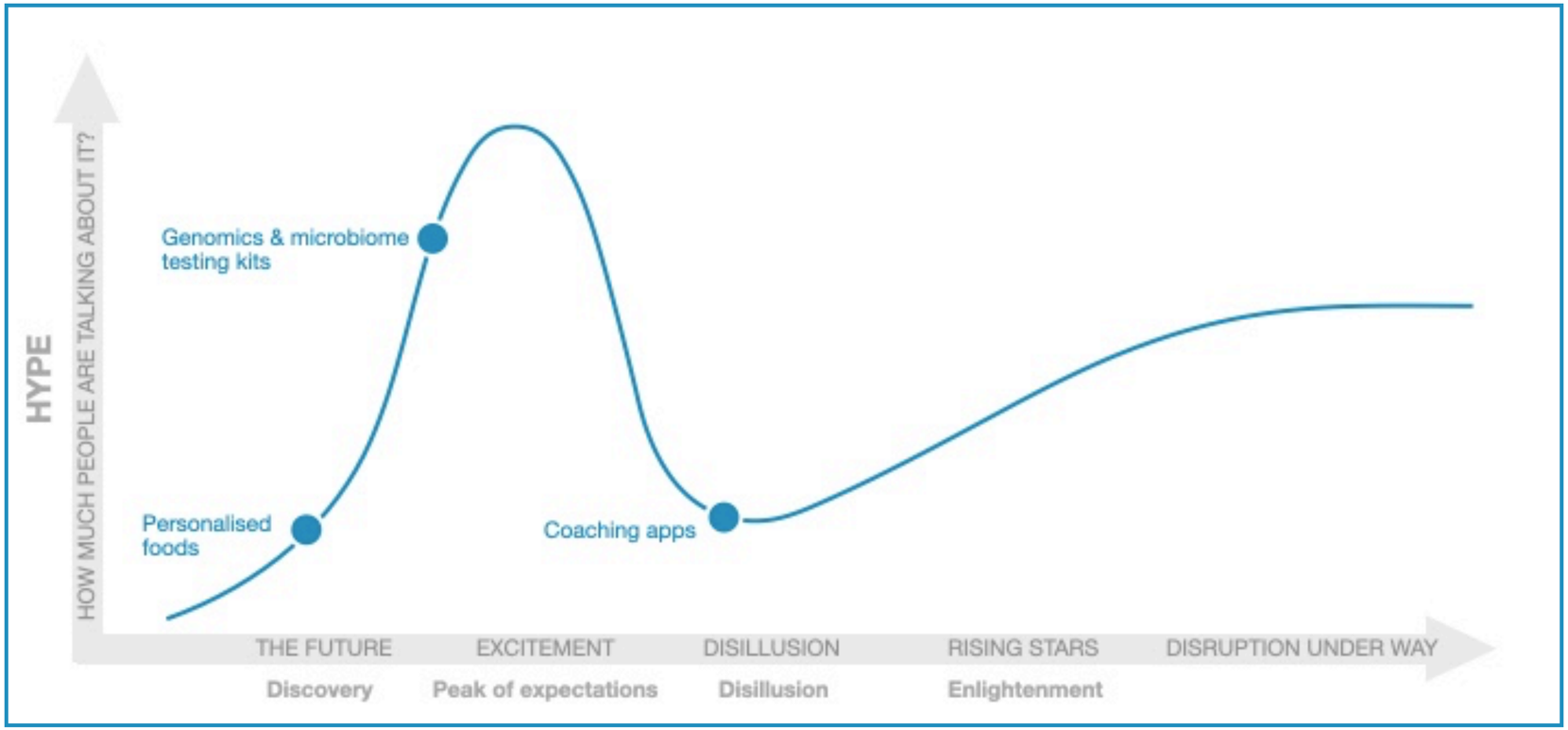
While DNA testing kits often crowd the spotlight, we can identify (at least) 5 tools to get more knowledge about yourself, from wearables tracking the glucose level in your blood to microbiome testing kits and breath analysers. All of these devices and kits are now available to the public with many competing startups in each space.



MEGA TREND #5: PERSONALISED FOOD

THE HYPE CURVE

As shown in the hype curve below, outside of coaching apps (which, due to questions of transparency and traceability, as mentioned previously, have a hard time developing sustainable business models), personalised food is not for tomorrow.



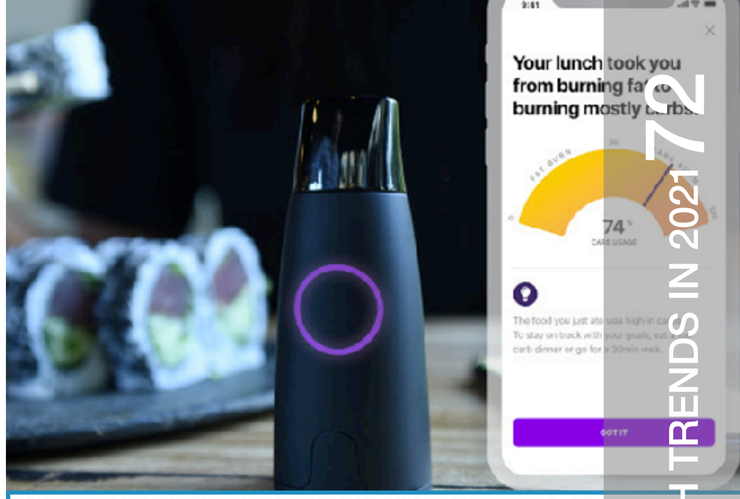
MEGA TREND #5: PERSONALISED FOOD

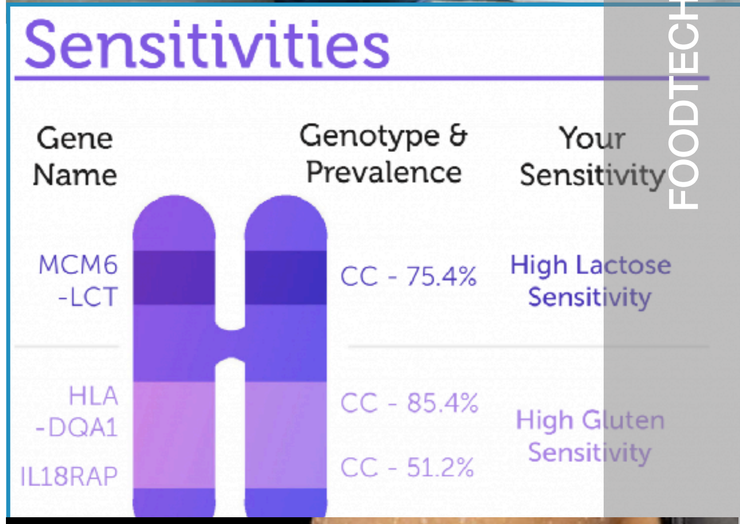
NUTRIGENOMICS

The space of nutrigenomics has been increasing in size over the past couple of years. Many startups have launched new devices and testing kits to help the consumer get more knowledge about himself:

- **DNA testing kit startups with a specialisation in food**, such as Genopalate
- **Breath analysers** such as Lumen or FoodMarble
- **Microbiome startups** such as Viome
- Startups focusing on **blood samples or glucose patches** (such as Clear.bio or Level). This space is the most recent and maybe the most active.

However, most of the data used by these startups is based on correlations which leads to interpretations that can be different, even opposite from one startup to another. **More scientific rigour will be needed to reach a broader audience**. Additionally, individual tests only provide a partial image of one's health and food requirements. DNA can help a consumer learn about his or her predispositions while microbiome and blood biomarkers are snapshots that must be repeated over time. A new generation of startups such as Zoe (a UK startup which raised $53M) combines two or more of these elements to better assess its users. And more than just advice, they tend more and more to coach (with humans on the line) the user on its journey toward the diet that suits him the best.





MEGA TREND #5: PERSONALISED FOOD

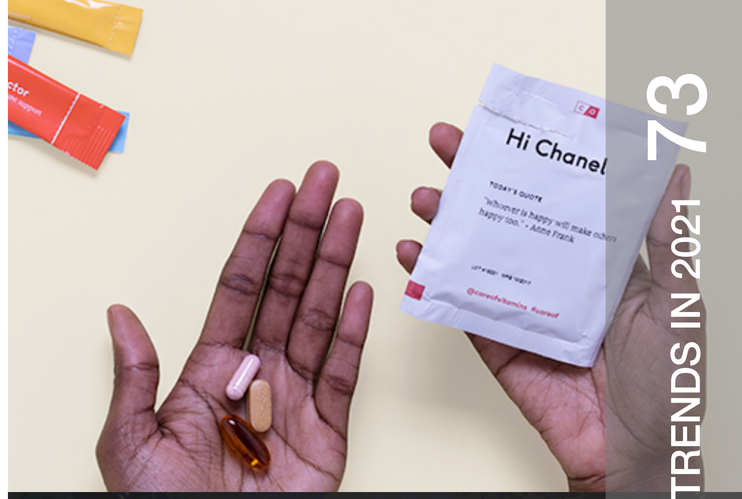
PERSONALISED FOOD

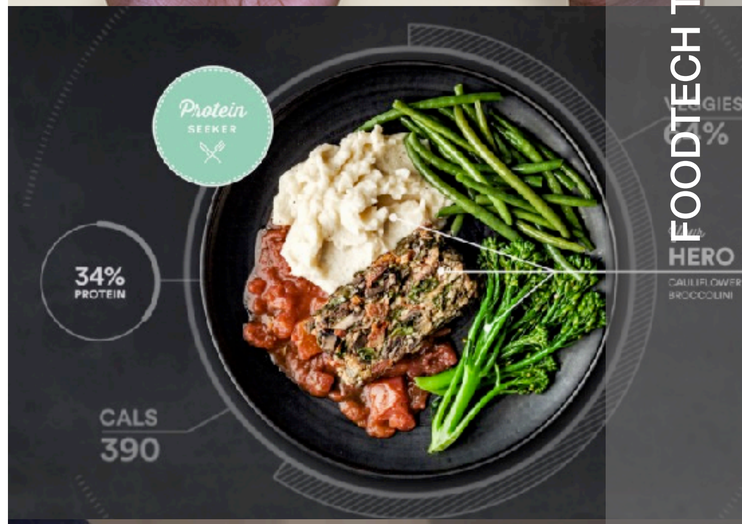
The promise of personalised foods is still far away. Many of the companies that have worked most closely with it, such as Habit have shut down. **By personalised food we mean food products or food supplements that would be truly personalised to fit to a consumer specific needs**. We can identify three paths toward this goal:

1- **personalised food supplements** such as those of Care/of or Viome (using your microbiome). This is the most realistic path right now even if this model has many limitations, one of which is its low adaptability.

2- **personalised and evolutive micronutrition**: on the verge of research and commercialisation, a handful of startups are working on devices that could be considered as “Nespresso for food supplements”. They deliver daily doses of the micronutrients you need, based on the knowledge they have of your needs and the feedback from your wearables (Apple Watch, Oura ring, etc.).

3- **personalised meals delivered at your door**, daily (from restaurants) or weekly. Most ventures that have explored this space have shut down due to high acquisition and operating costs. This space may be revived in the future when the data about personalisation is be more compelling.





GOT A QUESTION?

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