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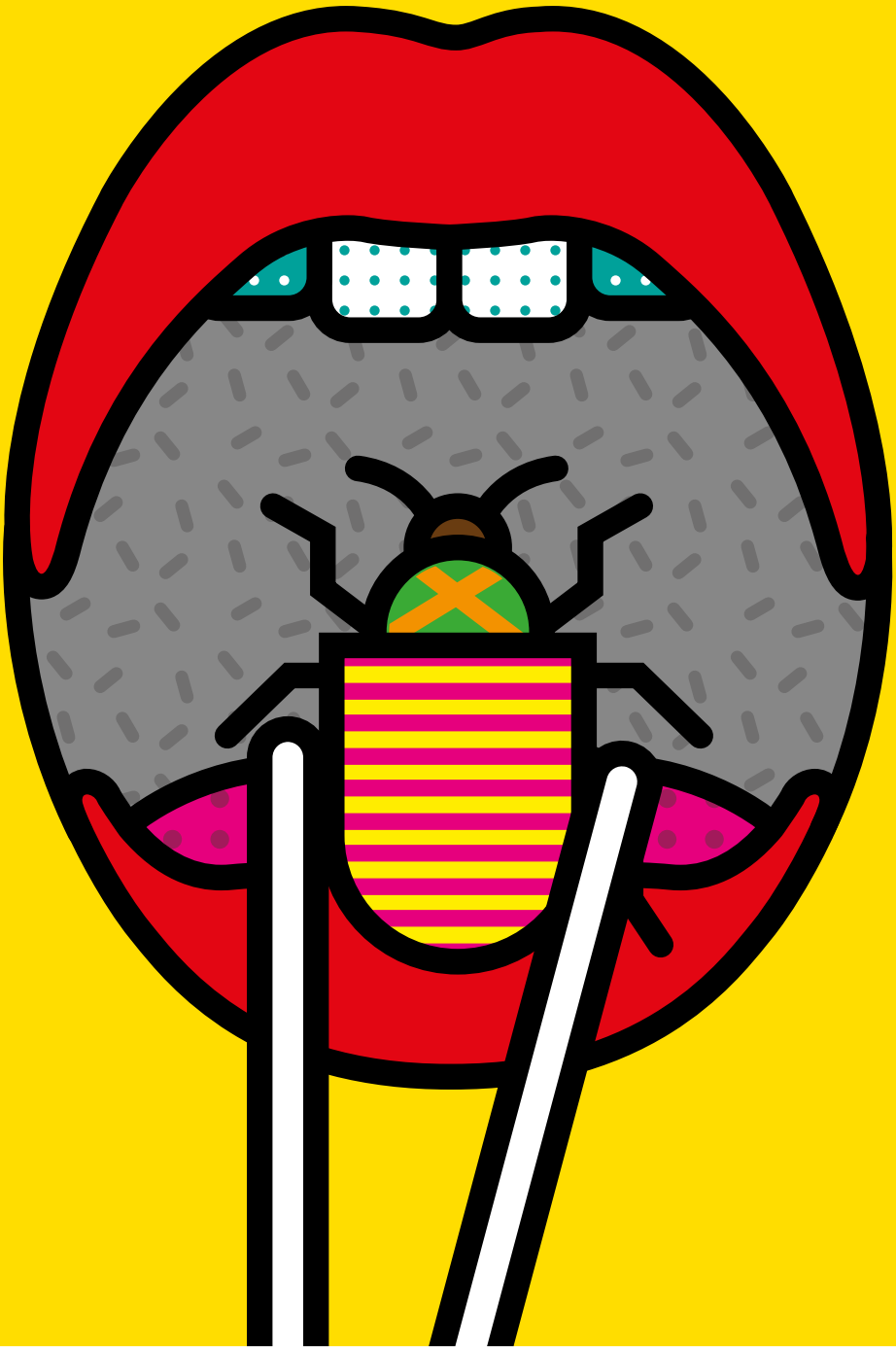
ECONOMIC AND SOCIAL STUDIES

GDI Study No. 44©

EUROPEAN FOOD TRENDS REPORT

Food is Eating my Life
Why Food is Becoming the New Pop

Christine Schäfer, David Bosshart, Christopher Muller



Publication details

GDI Study No. 44
European Food Trends Report
Food is Eating my Life: Why Food is Becoming the New Pop

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ISBN: 978-3-7184-7107-2

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Table of contents

02 **SUMMARY**

05 **FOOD IS (EATING) MY LIFE: THE FOOD TREND MAP**
Food is Health
> *Digestive Wellness*
> *Biohacking*
Food is High-Tech
> *Alternative Protein Sources*
> *Packaging*

22 **THE FOOD DISRUPTION MAP**

27 **FOOD TRENDS BETWEEN BIOHACKING AND DIGESTIVE WELLNESS**
Everything will be Food and Food will be Pop
> *Food Thought Leaders*
What happens in the belly, doesn't stay in the belly
From Artificial to (Sm)Art
The Data Aggregator wins

57 **KEY TAKEAWAYS**

60 **APPENDIX**
Methods and procedure

Summary

For a long time, food was a clearly defined experience, usually celebrated in rituals of the community. The tasty dinner at the family table, the fragrant curry at the business lunch. For the average modern European, of course, it's no longer roasts and sausage sandwiches that are on the menu, but crisp salads, olives, cheeses, pasta. And of course organic, local, fresh and natural, and nevertheless convenient. But until now, eating was almost always presumed to be a social act of limited duration. When the pasta is finished, when the wrap is eaten, the act is complete and the focus of very busy people turns to something else. The Food Trends Report 2017 shows: this is now changing.

Food is finding its way into almost every area of our lives. It is a wellness experience and lifestyle, an orientation point in the formation of the identity of the modern self, a compass in the search for morality, and sometimes an ersatz religion. It is one of the hottest topics in the social media chatter of the smartphone society, an apex of the culture of fun, but also an investment opportunity and a catalyst for a life that is as comfortable and sustainable as possible. **Food is everything and everywhere!**

Two trends in particular stand out: food is health and food is high-tech.

Health has become a lifestyle. Food is not only expected to taste good and fill the stomach, but also to be conducive to inner wellbeing. People are giving thought to their digestion, books like "Gut: The Inside Story of Our Body's Most Underrated Organ" are becoming bestsellers. The stomach and gut are threatening to steal the brain's crown as the key organ. Digestive wellness is becoming a driver of many other nutritional trends. Genes and diet interact in complex ways that are not yet understood. The better you know your body, the better you can treat it. Biohacking allows the self to play around with building the best version of itself. Superfood, nootropics and smart drugs can help in the process of self-optimisation.

Our lives today are shaped by high-tech. Nothing happens without the Internet, smartphones, computers and the Internet of Things. Where everything is increasingly networked, digitisation will not spare the world of food. Customer expectations are changing, and the entire architecture of the value chain is also being transformed. **The world of food is in a state of turmoil.** Value creation networks are emerging in which various different components are digitally linked, from drone delivery and 3D food printers directly in the homes of consumers to smart packaging offering customers an individual shopping experience through additional digital information on product content and production channels.

For companies, this means that the focus of the value creation network shifts to customers as these digital technologies give them more and more influence. Customer requirements are changing rapidly, niches for new business models are emerging. Only those who are quick to adapt to these changes by re-combining and creatively networking all elements of the value creation network can survive. The investment battle has begun; connecting centrally with as many players as possible is a must. Because the only winner will be the ruler of the information flows. **Data is king.**

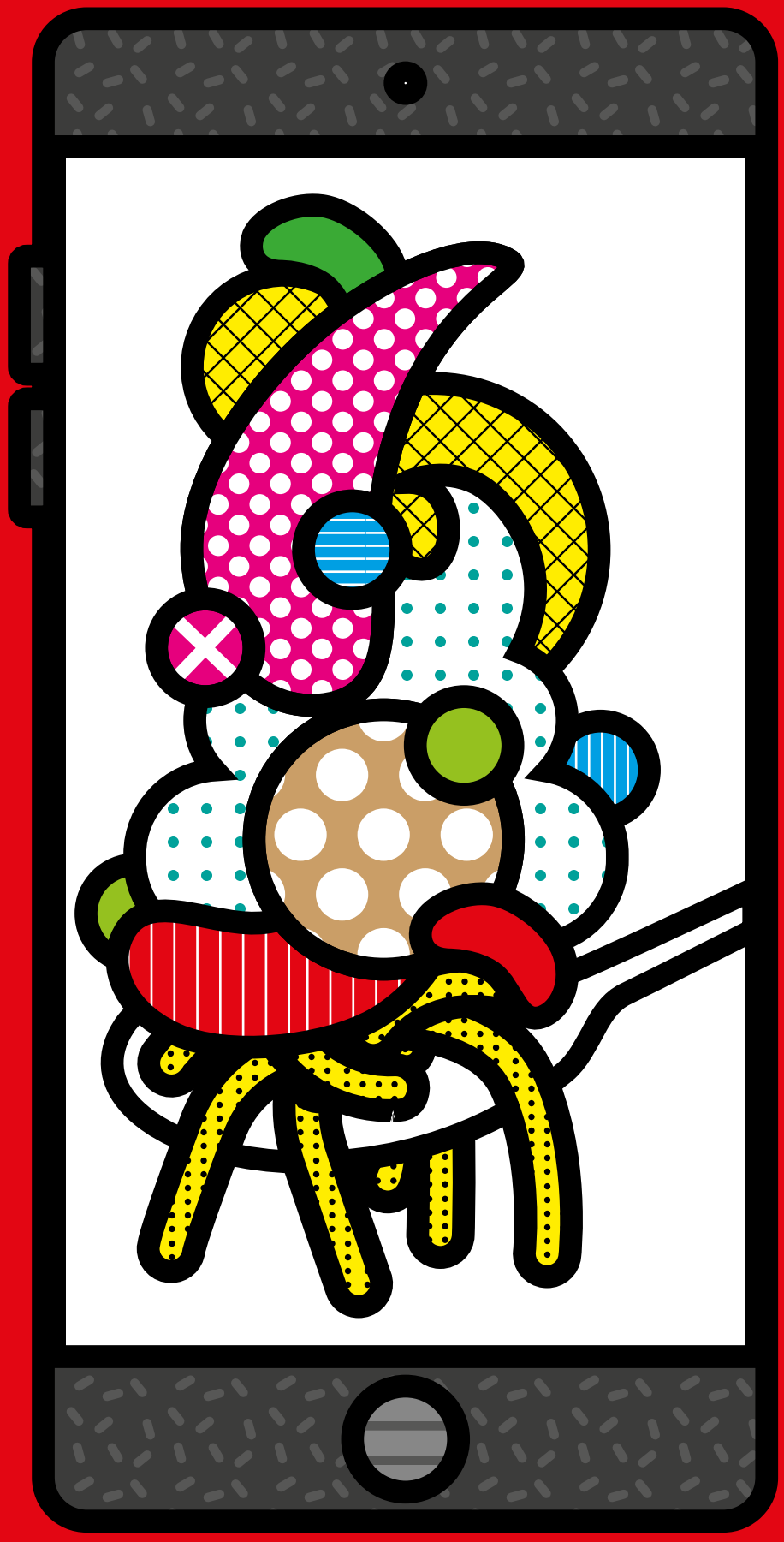
High-tech also relates to products themselves. Consumers not only avail themselves of alter-native sources of protein from soya, nuts or

even insects, they are also increasingly turning to imitation burgers made from plant fibres. Mincemeat from the laboratory, on the other hand, on which researchers are currently working, is still viewed with scepticism. There's already a cookbook with creative lab meat recipes: from steak in the form of a knitted scarf to meat lollipops.

The **Food Disruption Map** shows how these trends could spread through society. It reveals a relationship between technological progress and social acceptance: the more advanced a technology is, the more likely it will be accepted by society.

Regardless of how quickly these innovations find acceptance, we will not let go of our obsession with food. With their enthusiasm for social media, tech-savvy millennials have irretrievably revolutionised our relationship with food. Food is social, making it one of the hottest topics on blogs, Twitter, Instagram and YouTube. Food, hyperaesthetically stage-managed, is becoming ubiquitous. Food porn is a trend and food is pop. Food stars like celebrity chef Jamie Oliver or blogger Erin Anderson have long been able to keep up with Hollywood.

When food permeates every area of our lives, we continue to assign new functions to it. Food, health, tech-play, lifestyle, lynchpin of identity. What's next? Maybe we'll think nothing in 10 years of frying up an in-vitro steak or printing out a 3D pizza. One thing is certain: "Tell me what you eat, and I will tell you what you are" – truer today than ever before.



Food is (Eating) my Life

The Food Trend Map

Food is everything and everywhere! It is now much more than simply a matter of metabolism and the satisfaction of a basic need. In an effort to gain an overview of the various facets of food, the issue addressed at the very beginning of this European Food Trends Report was the question of the major changes along the entire value chain: what are the most important innovations "from farm to fork"? We therefore went to the experts in an online survey to ask about their assessments and observations with respect to the trends in the world of food. To ensure the best possible picture, we sampled knowledge from all areas of the value chain – from producers to restaurateurs to recyclers – and from various types of enterprises – large companies, start-ups and universities. The food trend map is the result of our sorting and clustering of the innovations they named.[1] The result surprised us, first and foremost by its breadth: food is finding its way into almost every area of our lives and involves many different aspects. In addition to the topics of health and high-tech, which we deal with in more detail below, we found that food is also:

> **Wellness** The subject of wellness has many overlaps with the issue of health. Wellness places particular emphasis on being well or feeling good, and goes beyond the eradication of diseases to focus on health and beauty as a comprehensive concept of physical wellbeing. Since what we eat sooner or later becomes part of our body, eating should not be neglected as a factor in our wellbeing. This can be either purely physical wellbeing with healthy, vitality-enhancing foods such as fruits and vegetables, or also mental wellbeing with comfort foods that do good in particular to the soul, such as chocolate or pizza.

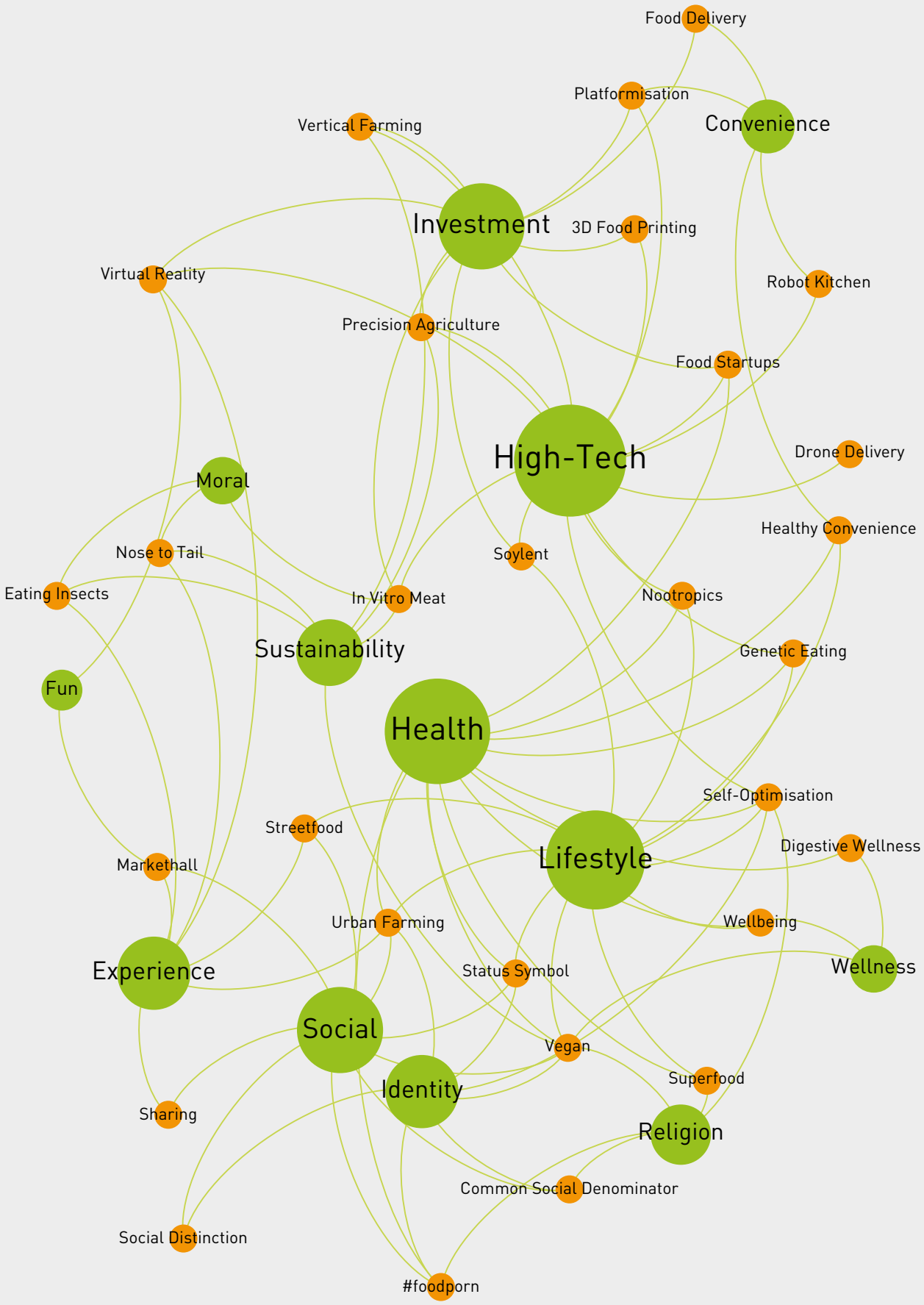
> **Lifestyle** Food – and especially the know-how involved in the production and preparation of food and drinks – has become a status symbol. We want to impress our friends with our foodie skills by cooking for and outdoing them with elaborate recipes and hyperlocal in-gredients. But food is not just a status symbol, it also plays a central role in the process of continuous self-optimisation that many people cherish in their lives. There is little point in counting the number of steps taken and calories burned if you don't know exactly what to put back into your body after the workout. And that requires knowledge and skills.

> **Identity** As early as 1826, the French writer and gastronome Jean Anthelme Brillat-Savarin wrote: "Dis-moi ce que tu manges: je te dirai ce que tu es"; in English "Tell me what you eat, and I will tell you what you are." Today, this quote is better known as "You are what you eat", and it has by no means lost its relevance in the past 170 odd years. On the contrary, we now tend to identify more closely with what we eat – and more closely still with what we do not eat, so that food can also be a form of social demarcation, or serve as a common social denominator within a group.

> **Social** Food is social. And this doesn't just mean the traditional social component of eating, in the form of a big, well-laid table seating lots of nice people. It was only through social

[1] The different facets of food (green) are larger – and more important – depending on the number of trends (orange) they are linked with.

The Food Trend Map



Source: GDI, 2017

media and tech-savvy millennials that food acquired the status it has today. Food bloggers, the Instagram accounts of famous foodies and the YouTube channels of celebrity chefs like Jamie Oliver are spurring the hype surrounding food on and on. On Instagram alone, you can find almost 130 million public posts under #foodporn – and counting. And few people will now be surprised to see someone standing on their seat in a restaurant to get the best angle for a photo of their plate. Today, we eat first with our smartphones. Sending photos to the right community can help determine how quickly a trend spreads. And it's not only the food that counts – it's also the colour of the plates, the glasses, the place setting, whether the focus is on a vegetable, or rather on the meat. Social means an ability to mediate.

> **Morality** A relatively new phenomenon is the active, indeed aggressively moralising com-ponent of food. Eating meat is wicked, only organic is good enough. The food industry is the devil, and you should get your products in any case only from farmers in the region. On the issue of meat in particular, there is a clear parting of the ways: some find it immoral to keep farm animals, let alone kill and eat them; others argue that it is part of the nature of the human being, and that meat has been on the menu since the beginning of humanity. New technological developments such as laboratory meat or the vegan burger create new possibilities, but also additional subject matter for debate. What is new here is that in addition to the moralising, there is also an ideological component. You can almost go so far as to speak of food populism: either you belong unconditionally to the ranks of the good guys, or you are one of the bad guys people refuse to debate. Populism is always about "unnecessary simplification". Industrial mass animal husbandry is basically demonised, while everything considered organic and natural is praised without question.

> **Religion** For a growing number of people, nutrition appears to be so central that it assumes quasi-religious traits. Religious means: food becomes superfood, culture becomes cult, fans become fanatics. But does this also mean that the kitchen is becoming the new church and that cooking is becoming the new worship? After all, the Christian religion in Western Europe is becoming less and less relevant, while the need for support and the search for meaning remain. There is also the question of the extent to which these quasi-religious products are in fact innovative, or tend rather to be clever tactics for optimising margins.

> **Experience** In the traditional food service industry in particular, the importance of the ex-perience component is growing. What began in the 90s with experience consumption is today being explored for commercial potential in all of the breadth and depth of possible services. Why should the consumer still leave the house when delivery services can bring everything conveniently to the doorstep? Will this only happen in the future if an incomparable experience can be offered that cannot be reproduced at home? An essential point appears to be the social component of food – how else to explain the great success of street food festivals?

> **Fun** Food can and should, and indeed must be fun – even if you were always told as a child that you shouldn't play with your food. Eating is an activity that appeals to all of the senses at once: appearance, smell, taste, how it sounds and feels in the mouth vary from dish to dish. There is a great deal to discover, and many an excursion

into the kitchen feels like a round-the-world trip. If the fun component becomes too dominant, there may be a yearning for infantilisation behind it. "Food is fun!" as a trend against growing up.

> **Investment** The last Food Trends Report two years ago revealed the sums invested in food start-ups. Today, the food industry is still an interesting market for investors, although the pace of new start-ups has settled down somewhat as a consolidation of companies takes place. Investment is focused on larger companies rather than many small start-ups (see sec-tion titled "The data aggregator wins").

> **Convenience** The focus of interesting innovation is currently in the area of micrologistics: how can I be faster by further simplifying the order, payment process, pick-up, as for ex-ample Starbucks has with voice recognition instead of keying in orders and pick-up within a few minutes. The customer then receives everything as a written confirmation on their smartphone, which they can also use to pay. The success factor, decisive in terms of margins, is therefore the short distance between mouth and device or ear and device. There is also the fact that we spend more time on the move and have less time for shopping and cooking for ourselves. Various convenience products can be of help here. Whether it's catering on-the-go, recipe boxes, first-class meal delivery or a fully automatic kitchen robot – digitisation is creating new possibilities in convenience.

> **Sustainability** Can we save the world with our eating habits? The food industry is a major consumer of resources such as energy, land and water, and also pollutes the environment with pesticides and greenhouse gases. If you decide in favour of a sustainable way of life, it only makes sense to pursue the same objective with respect to food. In addition to diets perceived as more sustainable, such as vegetarian or vegan, there are various labels used to distinguish products stemming from organic, local, regional or otherwise sustainable production methods. These create transparency and make it easier for consumers to choose the products they buy.

Food is Health

Today, health no longer means just the absence of illness. Health has become a lifestyle in which nutrition also plays a decisive role. Food and health can now scarcely be separated from each other, as the influence they exert on each other is so strong and the expectations of the benefits of successful nutrition have become so high.

However, awareness of this was not always as high as it is today. Particularly in association with the wellness trend, food is ascribed a greater role in personal wellbeing than ever before. More and more people are eating in accordance with defined principles, are mindful of the composition of the macronutrients in their diet – proteins, fats and carbohydrates – or con-sciously eschew individual components or eating at certain times of day. The flood of infor-mation from media, marketing and corporate publishing on these issues has grown exponentially – with increasing potential for confusion among consumers.

Good health also includes physical training, sport and self-optimisation, where food also plays an important role. People choose different diets depending on their goal (endurance, strength and muscle building, weight loss, skin care etc.).

DIGESTIVE WELLNESS

It is not for no reason that German author Giulia Enders' book "Gut: The Inside Story of Our Body's Most Underrated Organ" has held its position in the bestseller lists persistently since its publication in 2014. People are reluctant to discuss the intestines, possible digestive problems and related discomfort; it is disagreeable, perhaps slightly embarrassing and most certainly not sexy. But awareness is changing: the gut and digestion are being recognised as important components for physical wellbeing. Our gut is not only responsible for digesting food and carrying it back to the outside. The gut communicates continually with the other organs in our body, strengthens the immune system and can even affect our weight and our psyche.

The underrated gut

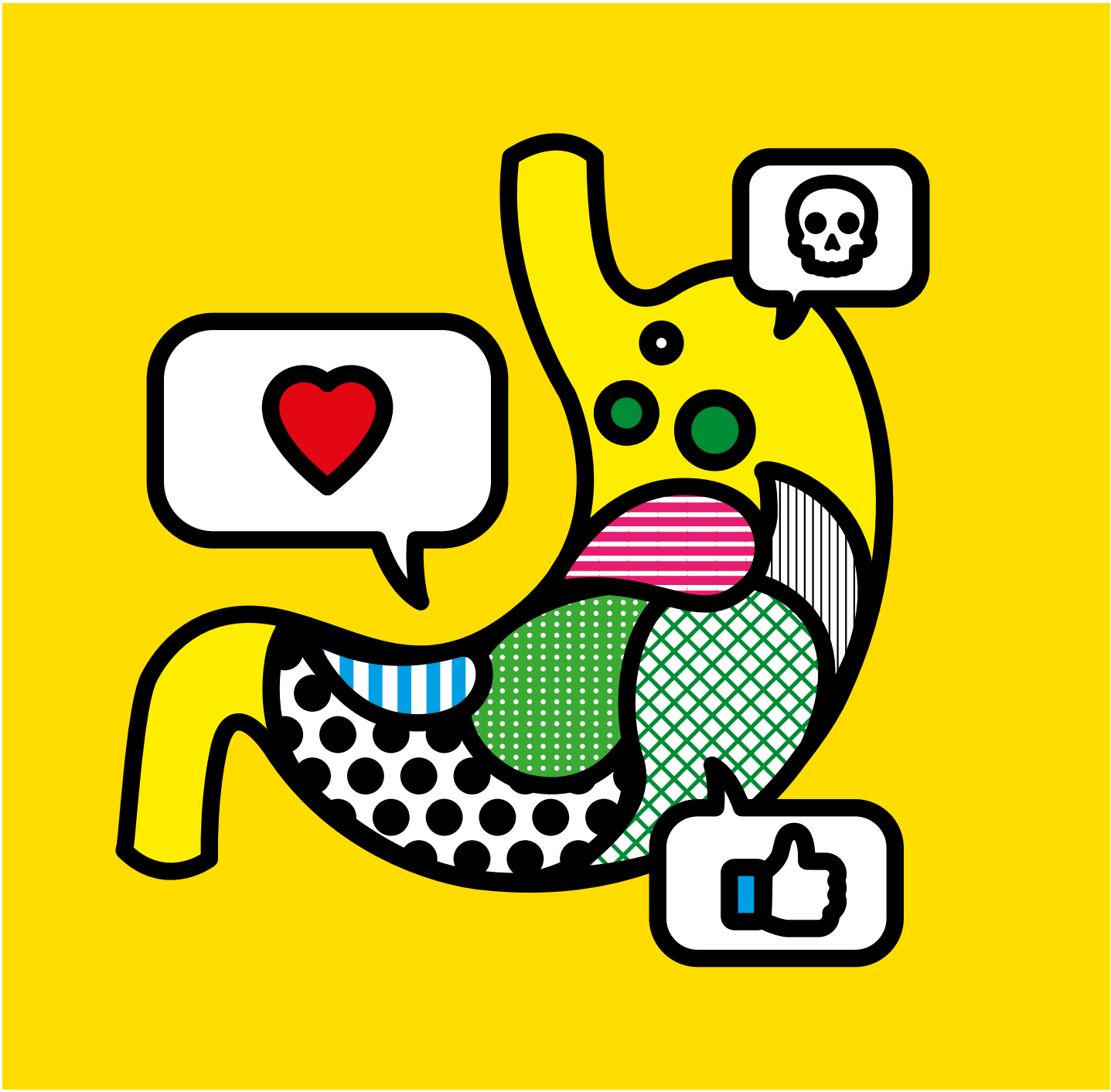
In the mother's womb, human beings develop from three tubes: the first is made up of the blood vessels, which tie together in the middle of the body at the heart; in the second are the nerves, all of which are connected to the brain; the third is the intestinal tube, which passes through us horizontally and ends in the bowels. The importance of both the heart and brain are appreciated. The gut, however, has not yet received the attention it in fact deserve[2] – although there is an old German poem that humorously described how the entire body suffers when the bowels refuse to play along. It's called Streit der Körperteile by Eugen Roth. If you're a German speaker, you might want to Google it. It's well worth a read.

Slowly, our ignorance about our digestive system is disappearing. The stomach and gut are being recognised as important organs and threatening to steal the brain's crown as the key organ. Digestive wellness – the aspects of wellbeing controlled and influenced by digestion – is the uber-trend acting as a driver for many other nutritional trends. For some people, the switch to a gluten-free, lactose-free, vegan or vegetarian diet comes down to an intolerance, an allergy or ethical and moral considerations. Others are simply looking for a diet that brings their digestion back into balance. Afflicted with discomfort, flatulence and other problems in the abdominal area, they start to experiment. How will I feel if I dispense with dairy products? What will happen if I eat less or no gluten? How will my body react to purely plant-based diet? These are the questions behind the mega-trend of digestive wellness.

Fermented miracle cures

Digestive wellness is not only a matter of turning away from certain foodstuffs, but is also about directly promoting it through the consumption of special foods. Fermented foods such as sauerkraut, kimchi, kombucha or probiotic yoghurt are credited for example with having a positive effect on the flora of the intestine. The principle of fermentation has been known for many hundreds of years. In the past, it was used mainly to extend the storage life of foods. Today, fermented foods are enjoying a major comeback, touted on countless food blogs as new miracle cures for digestive problems. These bloggers also generally provide a recipe for making fermented foods. Do-it-yourself as a trend

[2] Enders, G. (2014). «Gut: The Inside Story of Our Body's Most Underrated Organ».



has already been discussed in the last European Food Trends Report "Bits over Bites": The radical response to the loss of control resulting from the industrialisation of food is consistent DIY.[3] So you again know exactly what you are eating and where, by whom and under what conditions the food was produced. With this information, diet can be adapted to individual needs.

BIOHACKING

While the stomach and gut may be on the advance in terms of the importance of the organs in our bodies, the exact relationship between stomach, gut and brain remains largely opaque. Let us therefore ask ourselves: how can we influence and optimise our brain performance? The magic word is biohacking, which focuses on understanding your own body so well that you can

[3] Hauser, M., Bosshart, D., Höchli, B., Borek, J. and Muller, C. (2015). «European Food Trends Report: Bits over Bites». GDI Study No. 43.

> The radical response to the loss of control resulting from the industrialisation of food is consistent DIY.

optimise it by "hacking" it. And the better you know your body, the better you can treat it and optimise yourself. The goal is to become the best version of yourself.

No one recipe for all

Our bodies are complex systems: what we put into them has a pretty direct influence on what comes back out. This is not simply a matter of bodily secretions, but also of behaviour, health and performance. If we want better outputs – more energy and concentration, more strength, better performance in our job, no illness – we have to supply our body with the right inputs. The right inputs are something that is extremely individual and varies from person to person. There has been as yet only one way for individuals to find the right means and practices: trying things out, learning by doing. In this process, various known and new technical tools can help.

Biohacking works both in a natural way, where you try to hack the body and psyche using natural means. However, it can also tend towards the superhuman, where the body is hacked with new technologies such as microchips under the skin. At the moment, these biohackers are still in the minority.

Superfood for body and mind

Thanks to the biohackers, eating today is no longer just food intake and also no longer just pleasure or indulgence. Food is a means of self-optimisation. It is only when the body is filled up with the right fuel that it can also exploit its full potential.

But physical self-optimisation in the sense of being faster, stronger, more precise and more tenacious is only one side of the coin. There is also a focus on the optimisation of cognitive abilities. So-called "brainfoods" such as pumpkin seeds, avocados or algae are said to enhance the performance of the brain with their wholesome and beneficial ingredients. These foods are also referred to as "naturally functional", which means that they naturally contain substances that some believe have a health-promoting or performance-enhancing effect, without needing to be boosted by artificial means.

The naturally functional category also includes the so-called superfoods. For several years now, the hype around superfoods has been difficult to escape. Whether it's chia seeds, goji berries or avocados, these (sometimes exotic) magic bullets are touted on all sides. Pomegranate, with its high content of antioxidants, is said to reduce the risk of diabetes and cardiovascular disease, while broccoli can allegedly protect against cancer. Turmeric with its curcuminoids is supposed to have an anti-inflammatory effect and according to laboratory experiments can help against Alzheimer's disease. Blueberries, with their high

concentration of anthocyanins, can also have an anti-inflammatory effect. On the side, the little blue berries also help with muscle regeneration and against gastrointestinal diseases. While green tea with its high content of polyphenols can render aggressive substances in the body harmless, thereby protecting our cells, walnuts with their high share of unsaturated fatty acids are said to reduce cholesterol levels, improve vascular function and prevent cardiovascular diseases.[4]

FUNCTIONAL VS. NATURALLY FUNCTIONAL

Functional foods are foods that have been enriched with additional ingredients and are therefore supposed to have a positive effect on health. One of the best-known of these foods is yoghurt, which is enriched with probiotic bacteria.

Naturally functional foods have such ingredients naturally and do not need to have them added artificially.

In the report "10 Key Trends in Food, Nutrition & Health 2017" by New Nutrition Business, Julian Mellentin describes naturally functional as the king of trends that drives all other trends. The reason: instead of artificial foods, consumers much prefer food and drinks that in their perception offer a natural health benefit.

Examples of naturally functional foods: blueberries, olive oil, coconut water, almonds, chia seeds, turmeric.

Not a protected term

The term "superfood" is not protected and may be used freely as a marketing term. There is no exact definition of the criteria that a herb, a berry or a seed has to fulfil in order to be touted as "super". For health-conscious consumers, this does not seem to be a big issue. Superfoods are very popular and are advertised assiduously on food and fitness blogs and on social media. On Instagram alone, for example, there are more than two million public posts under #superfood that present healthy food porn aesthetically.

Serious consequences of the superfood mania

The hype surrounding superfoods can however also lead to big problems for local producers, as can be seen from the example of the avocado plantations in Mexico and the illegal logging associated with them: the global appetite for avocados, particularly in the US, is driving prices up. Mexican farmers are therefore planting more avocados, as they can earn higher profits from them. It is not by chance that they call avocados "green gold". To facilitate the trade, pine forests are cleared illegally and replaced by young avocado plants. Plants and animals such as the monarch butterfly lose their natural habitat. Because the cultivation of avocados is extremely water-intensive and many chemicals are often used, avocado mania is leading to water shortages and health problems.[5]

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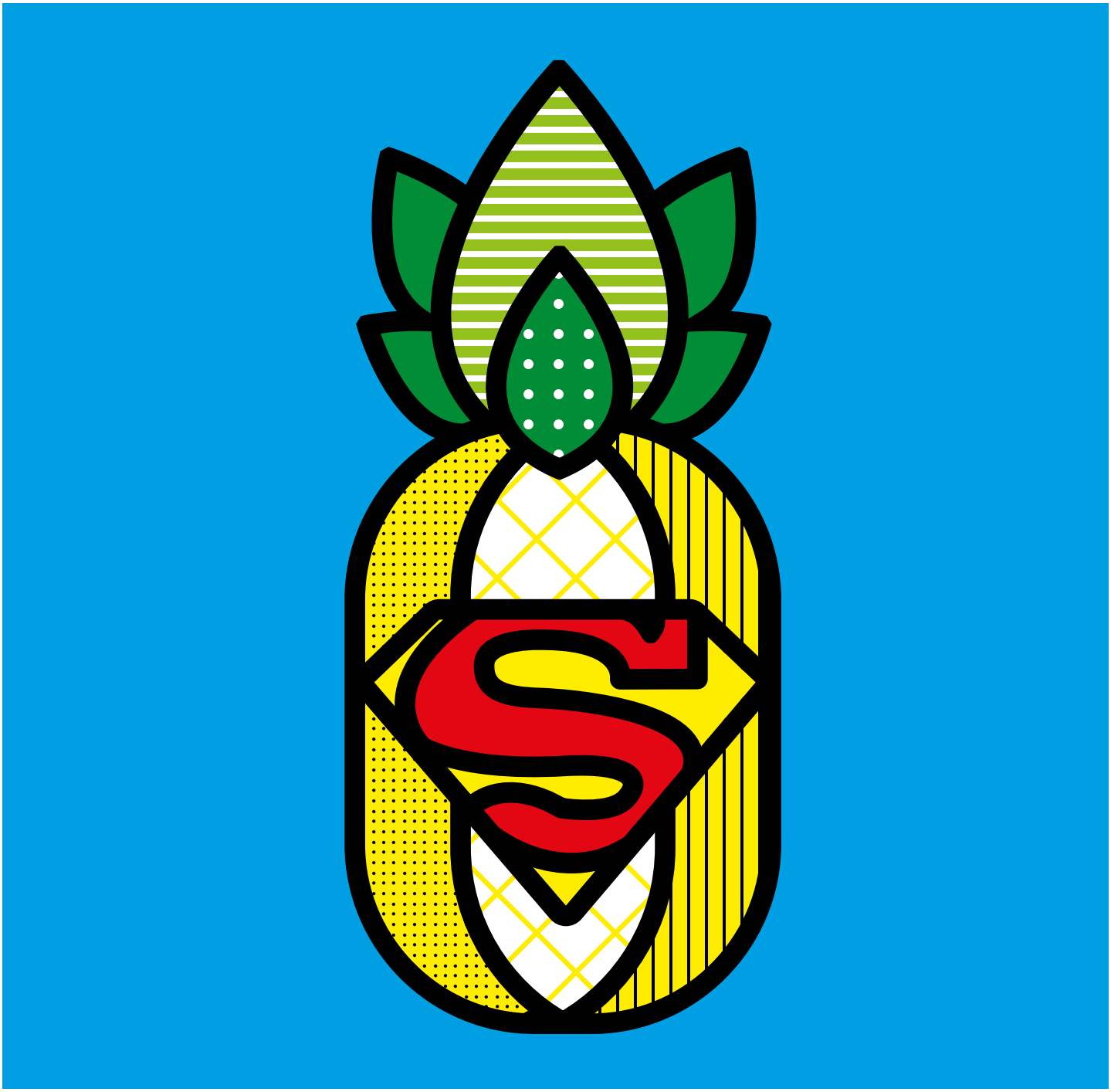
[4] GEO Wissen Ernährung (2016), Nr. 1, "Gesundes Essen: Was ist gut für mich – und was nicht?", pp. 82-105.

[5] The Guardian (10.08.2016). «Rising avocado prices fuelling illegal deforestation in Mexico». Online: www.theguardian.com/lifeandstyle/2016/aug/10/avocado-illegal-deforestation-mexico-pine-forests



The Mexican avocado market is now so large that Mexico's drug gangs have also scented a lucrative business. Michoacán, Mexico's most important avocado growing area, is controlled to a large extent by the "Caballeros Templarios" drug cartel. If farmers do not pay protection money, they can expect their plantations to be destroyed or that they or members of their family will be murdered by the extortionists.[6]

Drinking instead of eating

The form of biohacking most strongly focused on convenience is based on the complete eschewal of solid food, with normal foods replaced by a nutrient solution such as "Soylent". This form of nutrition is best known as "astronaut food". Soylent was developed by one Rob Rhinehart, a software developer who at some point decided he no longer wanted to waste his time on shopping, cooking and eating. He developed

[6] Latin Times (03.02.3014). «Are Avocados The New Blood Diamond? Learn The Violent Secret Behind Michoacán's Mexican Avocado Market». Online: www.latintimes.com/are-avocados-new-blood-diamond-learn-violent-secret-behind-michoacans-mexican-avocado-market-149408

The value chain is becoming a value network.

Soylent, a powder that when mixed with water can replace a whole meal. The powder is said to contain all essential ingredients in the right composition: carbohydrates, fats, proteins, vitamins, minerals – and all for a price of less than ten dollars a day.[7] No wonder Soylent is so popular in the hacker scene.

In Europe, Soylent is only available online and even there, not easy to get hold of. As al-ternatives, there are European products such Queal, Joylent, Mana or Bertrand, all pursuing the same idea as Soylent: one shake and the meal is eaten, or rather drunk. In addition to their standard product, some manufacturers offer variations such as Light (with reduced caloric content), Sport (with more proteins and carbohydrates), or vegan or caffeinated shakes. so that everyone can put together their own "menu" according to their personal preferences and needs. Whether or not the same unchanging diet over the long term may yet lead to symptoms of deficiency remains to be seen.

Performance enhancers from the pharmacy

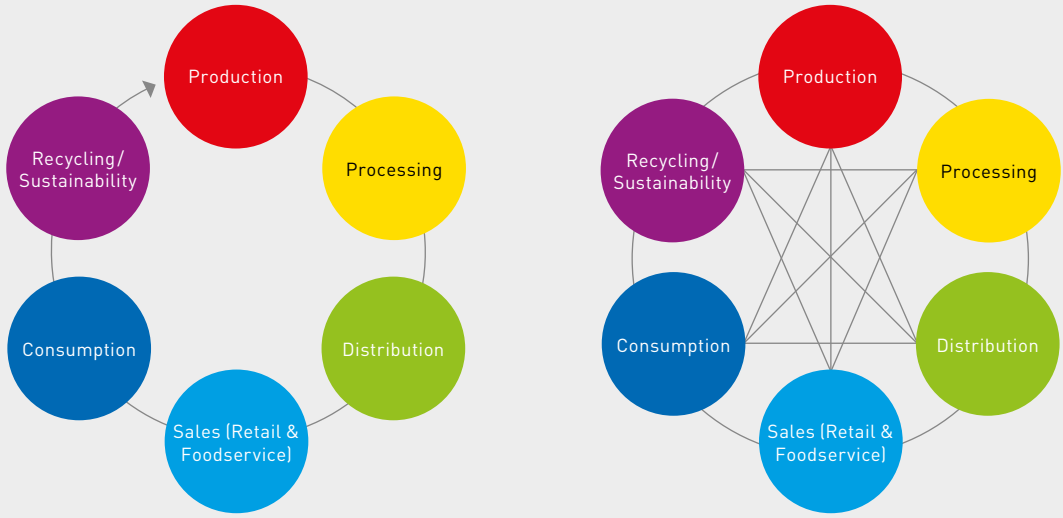
Going a step further than biohacking through food and drink are nootropics, also known as smart drugs. Nootropics are food supplements that support brain function in various different ways. They can aid concentration, soothe the nerves, help with falling asleep, improve memory, and also alleviate motivation problems. The basic principle of such performance enhancers is more or less known to every coffee drinker. In a highly competitive society, the right use of nootropics would seem to make the crucial difference. There are many different types of these smart drugs. While some rely on natural ingredients from plants and herbs, others also use synthetic substances.

A study conducted by university news network "The Tab" showed that in the UK, more than one in every five students had taken modafinil at some point – and as many as one in four at Oxford, Newcastle and Leeds. Of the students who have tried modafinil, no less than 20% indicated that they take the drug on a daily basis.[8] Modafinil is also considered a nootropic, but is available only on prescription. The drug can keep concentration levels very high over an extended period, and is therefore particularly valued by students during exams. In Silicon Valley, there is even more going on in terms of smart drugs, ranging from Adderall, a drug containing amphetamine, the active substance used to treat ADHD, through to low-dose LSD. People

[7] Online: www.soylent.com

[8] Thetab.com (08.05.2014). «One in five students have used modafinil: study drug survey results». Online: thetab.com/2014/05/08/1-in-5-students-have-used-modafinil-study-drug-survey-results-14102

From the Value Chain to the Value Network



Source: GDI, 2016

working at tech start-ups are using nootropics to try to push their intellectual capacity and creativity to the next level.

While a market for nootropics has emerged in recent years, the term is only very vaguely defined. For many agents, there are no long-term studies of possible side effects – whether wished for or unwanted. The question of whether you are really doing yourself and your phys-ical and mental health a favour with nootropics in the long run is therefore highly contentious.[9]

Food is High-Tech

Today, high-tech is ubiquitous. Who among us can imagine a life without the Internet, smartphones or computers? With the increasing use of these digital devices and the triumph of the Internet, we are all better and better connected. This interconnectedness and the changes to processes, objects and events that accompany it – which we call digitisation – are also not sparing the world of food.

As the process of individualisation, globalisation and digitisation proceeds, it is not only customer expectations that are changing – the architecture of the entire value chain is also being transformed. Food producers deliver over short distances directly to restaurant kitchens, drone delivery bypasses the big middlemen and consumers use 3D food printers to produce their food themselves. The linear path from farm to processing, distribution, wholesale, sales, consumption – and ideally recycling – is now only one way of many possibilities. Digitisation links the components of the value-added network to one another, and in some cases any clear demarcation between the individual links is no longer possible. The value chain is becoming a value network.

[9] Bulletproof (August 2016). «13 Nootropics to Unlock Your True Brain». Online: blog.bulletproof.com/13-nootropics-to-unlock-your-true-brain

ALTERNATIVE PROTEIN SOURCES

High-tech is not only changing the value chain, it also refers to the food itself. Proteins and alternatives to meat are currently the subject of a great deal of attention: in the context of the ubiquitous health and fitness trend, more and more people are thinking about whether they are consuming enough proteins or how they can increase their protein intake. Proteins are the new superheroes among the macronutrients, since carbohydrates took over the role of the villains from the fats.

Proteins have many different and important functions in the body. For athletes and fitness freaks, probably the most important function is muscle building: our muscles are made up for the most part of proteins, and to build up these muscles, to make them bigger, stronger and – in the eyes of many – more aesthetically pleasing, protein must be absorbed through our food. In terms of protein-rich foods, people often think first of meat, fish, eggs and dairy products – all proteins of animal origin. These are not compatible with a vegan lifestyle, which is why today, proteins of plant origin are already playing an increasingly important role. They are found for example in soya, nuts, pulses and mushrooms.

Muscles don't need meat

People choose a vegan diet both as a result of ethical and moral considerations, in other words for reasons of animal welfare and environmental protection, and for health reasons. To this day, the myth persists that big, strong muscles can only be built up with animal proteins. Researchers at the University of Massachusetts and Harvard Medical School conducted a study in which they attempted to show the difference between the influence of plant and animal protein on muscle and strength increase. The study, published in the "American Journal of Clinical Nutrition", did not however confirm the expected findings: the source from which the protein originates does not matter.[10]

For strength athletes who opt for a vegetarian or purely plant-based diet, this is good news – and it could help drive the trend towards a vegan lifestyle. Even more positive in terms of the benefits of a vegan diet are the findings of a study published in the journal "JAMA Internal Medicine": a reliance on plant-based proteins increases life expectancy, whereas the con-sumption of mainly animal proteins shortens life expectancy.[11] The eschewal of animal products is thus not only better for animals and the environment, but also for humans.

In search of the perfect substitute

But what now are the possible alternatives for a genuine meat refusenik with a sudden in-clination towards a real burger with all the trimmings? Here, high-tech can help. Innovative start-ups like Impossible Foods and Beyond Meat have set themselves the goal of creating the perfect burger from 100 percent plant-based ingredients that is in no way inferior to the meat original. From their appearance and consistency, their taste and smell to their sizzle on the

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[10] Mangano, K.M., Sahni, S., Kiel, D.P., Tucker, K.L., Dufour, A.B. und Hannan, M.T. (2017). «Dietary protein is associated with musculoskeletal health independently of dietary pattern: the Framingham Third Generation Study». The American Journal of Clinical Nutrition, 105(3):714-722.

[11] Song, M., Fung, T.T., Hu, F.B., Willett, W.C., Longo, V.D., Chan, A.T. und Giovannucci, E.L. (2016). «Association of Animal and Plant Protein Intake With All-Cause and Cause-Specific Mortality». JAMA Internal Medicine 2016, 1453 – 1463.

grill and dripping juices, the plant burgers are intended to be indistinguishable from a "real" burger. In addition to simple, natural ingredients such as wheat, coconut oil and potatoes, the Impossible Foods burger contains the protein "heme", in which the secret of the meaty flavour is said to hide.[12] Heme is found both in haemoglobin, our blood pigment, and myoglobin, a muscle protein, as well as in every plant cell. Heme is therefore responsible for both the meaty taste and the "bleeding" of the plant-based burgers. Will this be enough to tempt meat-eaters to give up beef burgers completely?

Healthier and more environmentally friendly

In addition to human health, the primary motives for the development of plant-based meat with the power to turn even dedicated carnivores into vegetarians are climate protection and animal welfare. The industrial production of meat harms both animals and our planet, as it involves major land requirements, enormous consumption of resources and global warming due to greenhouse gases. Opting for a plant-based burger over one made of beef can help to counteract these problems. According to Impossible Foods, for example, their burgers require twenty times less land and four times less water, and produce eight times less greenhouse gases than conventional minced beef burgers.[13] And for these burgers, no animals have to be killed.

There are plant-based substitutes for eggs and dairy products too, such as the VeganEgg from Follow Your Heart[14] or plant-based mayonnaise from Just Mayo. For lovers of fish and seafood. there are also vegan alternatives, often containing algae, such as the Vegan Toona from Sophie's Kitchen.[15] And the shrimps from New Wave Food are said to be so convincing that customers can hardly distinguish them from real shrimp.[17]

Mincemeat from the laboratory

The motivation factors behind plant-based burgers are the same as those behind the in-vitro meat being developed by a Dutch team of researchers led by biochemist Henk Haagsman, who grow meat in the laboratory from animal stem cells. They do this by taking cells from an animal – for example a cow – in a painless process. The cells are then multiplied in a liquid culture medium. The tissue is stimulated with small electric shocks to form muscle tissue with the required hardness.

So far, however, the laboratory meat can only be grown in thin layers from which it is pos-sible to produce a kind of mincemeat, but as yet not a steak. For a steak, the tissue would have to grow in a three-dimensional structure and the muscle cells would have to be subjected to regular mechanical movement.[18]

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[12] Online: www.impossiblefoods.com/burger

[13] Online: www.impossiblefoods.com/faq

[14] Online: followyourheart.com/products/veganegg

[15] Online: www.eatjust.com/en-us/products/consumer/mayo

[16] Online: store.veganessentials.com/vegan-toona-by-sophies-kitchen-p4263.aspx

[17] Online: www.newwavefoods.com

[18] Online: www.futurefood.org/in-vitro-meat/index_de.php

The idea behind laboratory meat is simple: animals are extremely inefficient meat producers. They need a lot of space – more than two thirds of the world's agricultural land is used for grazing[19] – as well as huge quantities of water and feed. In addition, the greenhouse gases produced by animals also contribute to global warming. Shifting the production of meat from animals to the laboratory could save many resources and reduce greenhouse gas emissions.

Acceptance up, costs down

In society at large, there is as yet not a great deal of acceptance of laboratory meat, which for many people still sounds a little too much like science fiction.[20] There are also not many people who have had the opportunity to try an in-vitro burger. When the first burger was tested live on TV in 2013, the price was still prohibitive: at 325,000 US dollars, it was not exactly a bargain. Today you can get it for 80 dollars per kilo, or 11 dollars per burger. The road to the mass market is paved.[21]

As to what the world of in-vitro meat might look like in years to come, the Dutch organisation Next Nature Network in its book "Meat the Future" presents 45 speculative recipes with laboratory meat, from meat ice cream to steaks in the form of a knitted scarf or mussels from the test tube – there are virtually no limits to the imagination.[22]

Grilled grasshopper instead of fillet of beef

For two billion people and the vast majority of nations, insects are part of the standard diet. In Europe, they are still little known as a food product. In the EU, this is not only due to the fact that the idea is not embedded in the culture. Under EU law, insects are subject to Regulation (EC) No 258/97 concerning novel foods and novel food ingredients. Novel foodstuffs that were not yet on the market before this Regulation entered into force require approval from the relevant authorities. To date (April 2017), the EU has not yet approved any insect as a novel food. In Switzerland, food law was amended at the end of 2016. Since 1 May 2017, three insect species can be offered for sale as foodstuffs, with the bill of fare enjoyed by Mr and Ms Swiss now supplemented by mealworms (Tenebrio molitor in the larval stage), crickets (Acheta domesticus, adult form) and the European migratory locust (Locusta migratoria, adult form).[23]

There are important environmental reasons for having crickets, grasshoppers and other creepy crawlies on the menu. The breeding of insects requires less land, less water and is less of a burden on the climate, but not only that: a much higher proportion of the animal can also be used: around 80% of an insect is edible, whereas

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[19] Online: www.weltagrarbericht.de/themen-des-weltagrarberichts/fleisch-und-futtermittel.html

[20] Frankfurter Allgemeine (03.02.2016). «Meat the Future». Online: www.faz.net/aktuell/stil/essen-trinken/kuenstliches-fleisch-der-burger-aus-der-petrischale-14030839.html

[21] Inverse (16.01.2017). «The Cost of a Lab-Grown Burger Has Dropped Dramatically». Online: www.inverse.com/article/26464-cultured-meat-burger-price

[22] Online: www.nextnature.net/projects/meat-the-future

[23] Information letter 2017/1 (06.04.2017). «Production and processing of insects for use as food». The Federal Department of Home Affairs FDHA, Swiss Federal Food Safety and Veterinary Office FSVO, Food and Nutrition. Available in German, French, and Italian.

for a cow it is only about 40%.[24] In addition, the little creatures also contain many valuable proteins and unsaturated fatty acids. The question is: will the Swiss population want to replace their fillet of beef with crispy grasshoppers, their grilled sausage with crickets on a skewer, their Angus beef burger with mashed mealworms?

PACKAGING

Because consumers are going less and less to products as products increasingly come to consumers, packaging is gaining in importance. For perishable foodstuffs in particular, the packaging makes a huge difference. Can the cold chain be maintained uninterrupted? Is the packaging sealed? Is the quality of the products guaranteed? Is the packaging visually appeal-ing? Are the packaging materials easy to dispose of or recycle? These are some of the questions faced by delivery services. And consumers want packaging that on the one hand is convenient, and that is sustainable and environmentally friendly on the other.

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[24] van Huis, A., Van Itterbeeck, J., Klunder, H., Mertens, E., Halloran, A., Muir, G. und Vantomme, P. (2013). «Edible insects: future prospects for food and feed security». Food and Agriculture Organization of the United Nations.

In addition to its protective, storage and transport functions, packaging also has a marketing function. Packaging should attract the attention of the consumer, convey product information and guarantee the quality of its contents by being in a perfect and undamaged condition.

Fully informed

With new technological developments, packaging is being supplemented with new functions that turn it into smart packaging. With a smart tag on the packaging, for example, the freshness of the products inside can be measured and displayed on a colour scale on the packaging.[25] The customer then knows immediately if the product is safe to eat, even though the best-before date has already passed.

Extended packaging works with a barcode or a chip integrated into the packaging. The code can be scanned with a smartphone, and special apps can provide the consumer with additional information about the product and its ingredients or the conditions under which it was manufactured. One by now fairly well known example of this kind of app is CodeCheck, an online product manual that provides additional information on countless products. The principle is simple: you use your smartphone to scan the barcode of any product or search manually for a product of your choice to get information about ingredients, nutrients, manufacturers, labels and more[26]

Chips incorporated into packaging also open up completely new possibilities for tracking and tracing, allowing the progress of products through the various stages to be tracked in real time. Track and trace also protects against counterfeiting, which means that not only consumers but also manufacturers benefit from smart packaging.

Still in its infancy is the concept of augmented reality packaging (AR), where an augmented version of reality is made visible by a smartphone or special AR glasses. Consumers gets a wide range of additional information there is no room for on the package, and can quickly find out which products on the shelves might be of interest to them and which run contrary to their moral outlook. Which muesli is gluten-free? Which potato chips were made using palm oil? Which rice was produced under fair conditions? This creates a personalised shopping experience in each supermarket that can be completely different from customer to customer.

Opposing concept: no packaging at all

The volume of packaging used, however, is one reason for the huge mountain of waste we produce with our way of life. As part of a backlash in response to this, numerous businesses have sprung up in the last few months offering their products without packaging. Following the zero-waste principle, each consumer brings their own containers and fills them with the products they need, whether it's rice, pasta, herbs, oil or shower gel. If you happen not to have any containers at home, you can buy some at the store – and they are of course reusable. Take-aways are also picking up on the zero-waste trend and increasingly offering reusable dishes that can be bought once and filled again with the next meal purchased, somewhat reducing the mountain of plastic generated by take-away food.

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[25] CBS News (17.03.2014). «Smart tags change color when food goes bad». Online: www.cbsnews.com/news/smart-tags-change-color-when-food-gets-spoiled

[26] Online: www.codecheck.info

Edible plastic

To prevent customers having to carry their own containers around, some companies are al-ready offering biodegradable packaging. The design company Skipping Rocks Lab has found a solution to make water bottles more sustainable. They have designed an edible, drinkable and compostable bubble in which water can be easily transported. Innovations like these could help to ensure that the gigantic islands of plastic floating in the oceans, which are largely made up of water bottles, do not continue to grow.[27]

Saltwater Brewery also focuses on the ocean. This is a brewery that wanted to do something about the many marine creatures dying because of the plastic six-pack rings floating in the water. The animals become entangled in the plastic or are poisoned by eating it. So Saltwater Brewery developed a material made from wheat and barley waste – by-products of the beer-making process – that is sturdy enough to hold a six-pack of beer. Animals can eat the new material without poisoning themselves. After a few hours in the water, the material simply dissolves.[28]

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[27] Creators (13.04.2017). «This Drinkable Water Bubble Could Kill the Plastic Bottle Once and For All». Online: creators.vice.com/en_au/article/drinkable-water-bubble-plastic-bottle-killer

[28] The Guardian (29.05.2016). «Florida brewery creates edible beer holders to save marine life». Online: www.theguardian.com/sustainable-business/2016/may/29/florida-brewery-creates-edible-beer-holders-save-marine-life-saltwater

The Food Disruption Map

The Food Disruption Map shows the feasibility and acceptance of present and future inno-vations. The innovations and trends are shown on two axes. The technology axis describes how far the feasibility of an innovation has advanced. Are we still at the start of a development, are we at the laboratory stage, or can we already not even imagine life without this new technology? The acceptance axis describes the extent to which an innovation is anchored in the mindset of the population. Is a technology rejected in principle, are we slowly getting used to it, or is it in fact explicitly wished for?

Between feasibility and acceptance
The combination of these axes produces four quadrants.

The left quadrant contains innovations or concepts that are at their very beginning in terms of both technological development and social acceptance, for example the quest for immortality. While modern medicine may be making tremendous progress, it has not yet been able to defeat death. And even if it did succeed one day: socially, immortality would bring about major problems, and the trend is already towards too many people on earth today. One solution would be immortality in virtual form, as a data-self. At the moment, that still sounds like science fiction.

The top quadrant contains innovations that are still at their beginning or do not yet even exist, but which would society would like to see, for example beaming or teleportation, simply vanishing from one place and turning up almost simultaneously in another, as we know it from Star Trek. Most commuters would no doubt be very happy to see such a technology.

In the right quadrant, we see innovations and concepts that are well advanced in terms of both technological development and social acceptance and which we could no longer imagine not having, such as the Internet or smartphones, which we could not or would not do without today.

The bottom quadrant contains innovations that are technologically well developed and fea-sible but are viewed critically by society or even completely rejected, for example the creation of a database to collect all information, including fingerprints and DNA, about every citizen of a country, Technologically speaking, this would be entirely feasible, but its social acceptance is low because personal data protection is perceived as very important.

The Food Disruption Map shows a relationship between technological progress and social acceptance: the more advanced a technology is, the more likely it will be accepted by society. This can be explained by the fact that investment is primarily in the development of technologies in which consumers – private individuals or companies – have a fundamental interest. But maybe it also works the other way around: the media is reporting more about technologies that are more advanced and widespread. Society is slowly getting used to it and could perhaps give the technology a try. Fears of contact are diminishing, the horizon for new possibilities is expanding.

Outliers on both sides
There are outliers on both sides of the Food Disruption Map: digestive wellness or aug-mented reality packaging are technically still in their infancy, although they undoubtedly have huge potential. Socially, these innovations are widely accepted or even explicitly wished for. This may

lead to more investment in development, so that these technologies make major progress in the next few years.

At the other end of the spectrum are GMOs, genetically modified organisms. The techno-logical possibilities are well developed. However, the technology is rejected by society. Too little is known about the long-term consequences of genetically modified organisms as sources of food. In Switzerland, the GM moratorium was extended in March 2017 by a further four years. Although the Federal Council would have liked to see genetically modified and natural plants existing side by side, this was rejected by the elected representatives in the National Council.[29]

[29] Neue Zürcher Zeitung (01.03.2017). «Gentech-Moratorium wird verlängert». Online: www.nzz.ch/schweiz/landwirtschaft-gentech-moratorium-wird-verlaengert-ld.148466

The Food Disruption Map

In a nutshell: innovations and concepts on the Food Disruption Map

3D Food Printer
Food comes out of the printer: you pour in a paste at the top, pizza, burger or dessert come out at the bottom.

AR Packaging
Augmented reality allows customers to call up additional information about products, creating a personalised shopping experience.

Biohacking
Optimisation of personal biochemistry by various means such as superfoods, food supple-ments or smart drugs like modafinil.

Digestive Wellness
What happens in the belly doesn't stay in the belly: the influence of food on health must be viewed holistically.

Food Replacement
Thanks to Soylent & Co., you don't have to eat any more, the powders contain all the essen-tial nutrients.

Food Waste Prevention
Nose-to-tail, the complete utilisation of animals for slaughter, unpackaged food and dumpster diving, rummaging for usable things in waste, as strategies against food waste.

Genetic Eating
Personalised menus compiled on the basis of the genetic structure of the individual.

GMO
Genetically modified organisms are food-stuffs or animals whose DNA has been altered artifi-cially.

Healthy Convenience
Fusion of science and romance: not only fast, but also good. The catchword is: "From Fast Food to Fast Good".

In-Vitro Meat
Meat no longer comes from animals but is grown in the laboratory.

Eating Insects
Two billion people around the world already eat them every day: grasshoppers, meal-worms and crickets as sustainable sources of protein.

Platformisation
A business model based solely on linking up supply and demand on online platforms (Ube-rEat, Deliveroo, Alibaba).

Precision Agriculture
Precision farming takes account of diffe-rences in the soil and microclimate of land under cul-tivation in order to optimise the yield.

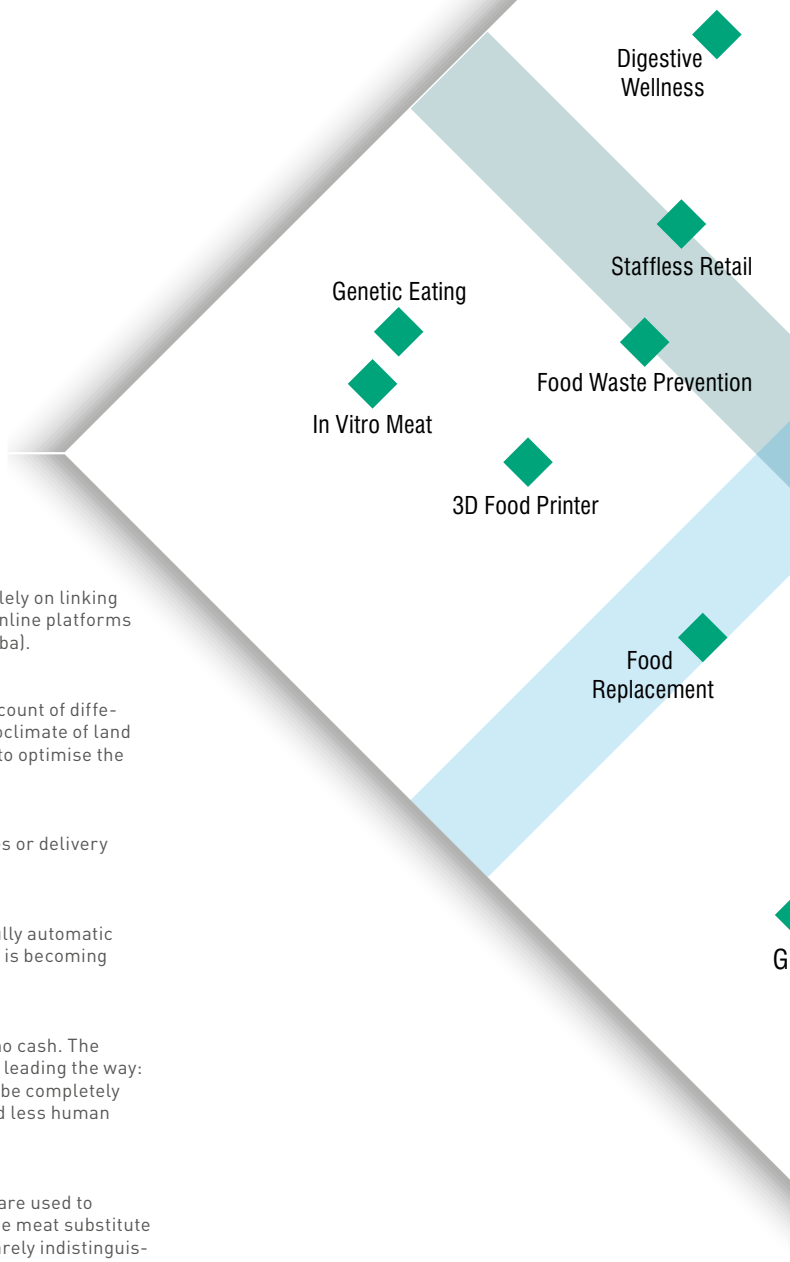
Robot & Drone Delivery
Food is brought from drones or delivery robots.

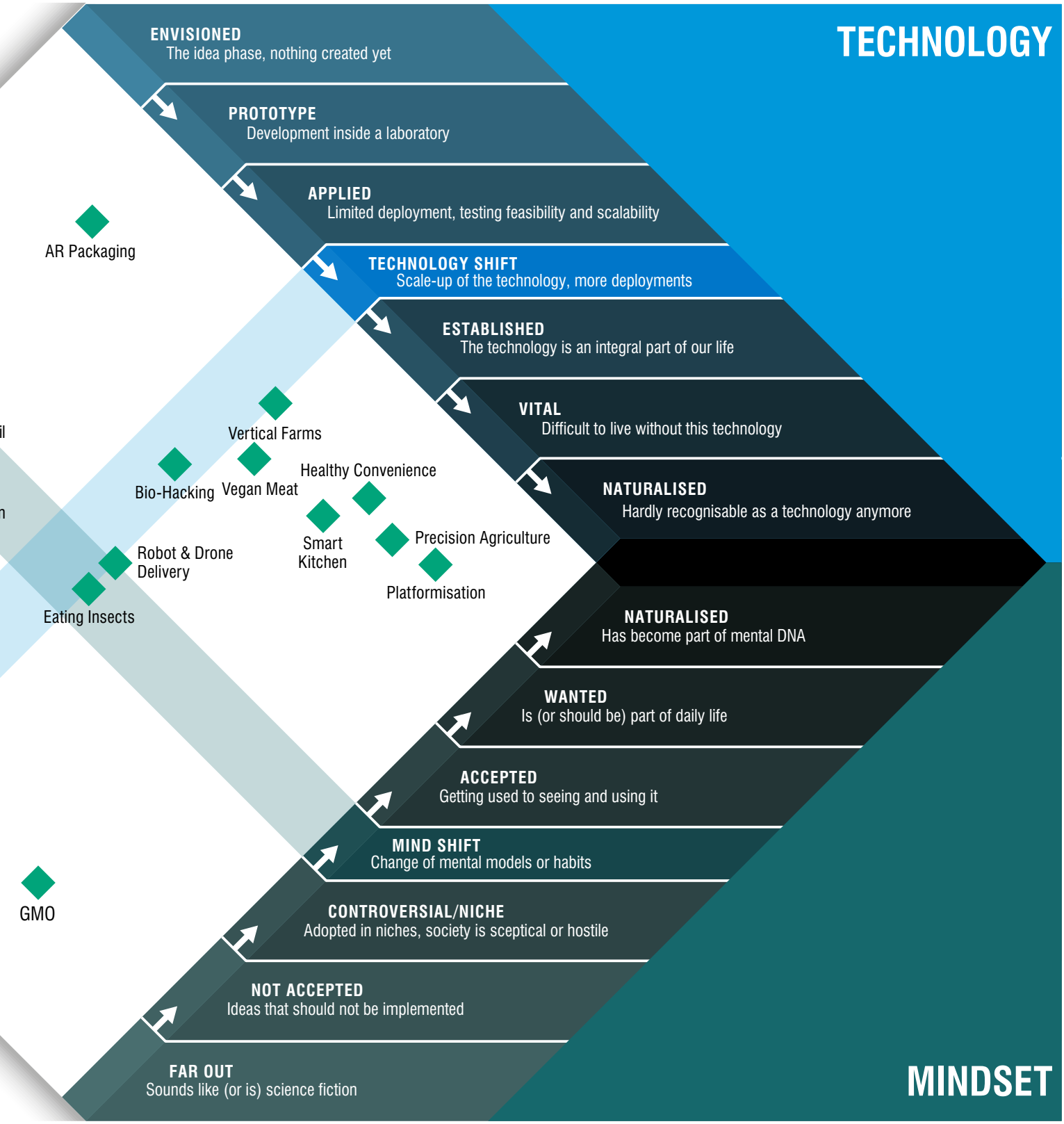
Smart Kitchen
From intelligent ovens to fully automatic cooking robots: the kitchen is becoming smart.

Staffless Retail
No checkouts, no queues, no cash. The supermarket Amazon Go is leading the way: in the future, shopping will be completely automatic and with less and less human contact.

Vegan Meat
Pure plant-based proteins are used to produce deceptively genuine meat substitute products, which are now barely indistinguis-hable from animal products.

Vertical Farms
The production of food is rising fast, and not just on the ground: herbs, salads and vegetables are being cultivated in vertical farms. Production is coming back to the city from the country.




TECHNOLOGY
ENVISIONED
The idea phase, nothing created yet
PROTOTYPE
Development inside a laboratory
APPLIED
Limited deployment, testing feasibility and scalability
TECHNOLOGY SHIFT
Scale-up of the technology, more deployments
ESTABLISHED
The technology is an integral part of our life
VITAL
Difficult to live without this technology
NATURALISED
Hardly recognisable as a technology anymore
NATURALISED
Has become part of mental DNA
WANTED
Is (or should be) part of daily life
ACCEPTED
Getting used to seeing and using it
MIND SHIFT
Change of mental models or habits
CONTROVERSIAL/NICHE
Adopted in niches, society is sceptical or hostile
NOT ACCEPTED
Ideas that should not be implemented
FAR OUT
Sounds like (or is) science fiction
MINDSET
AR Packaging
Vertical Farms
Bio-Hacking
Vegan Meat
Healthy Convenience
Smart Kitchen
Precision Agriculture
Platformisation
Robot & Drone Delivery
Eating Insects
GMO

Food trends

Between Biohacking and Digestive Wellness

Everything will be Food and Food will be Pop

Are we obsessed with food? Will our obsession with food continue to lead to all areas of our lives being influenced by food? It looks almost that way. Food is becoming the new pop or, as Tyler Cowen writes: "Once We Listened to the Beatles. Now We Eat Beetles."[30] 50 years ago, music was an important factor in our identity. Although music was not as accessible back then as it is today via streaming services and video platforms such as Spotify, YouTube and so on, it was in fact quite simple, perhaps even simpler, to identify with a music style and find people who listened to the same music. There was country, pop, rock – and not this incredible cornucopia of different styles and subcultures that we see today. Music also had a greater political influence in that era and could inspire people to think or protest.

Social act and demarcation

Over the past 30 years, there has been a shift: music became less central, and the importance of food as an identification factor has increased steadily. We identify ourselves with food and with what we eat or do not eat where and with whom. Food has always been a social act, but today, it increasingly serves as a point of demarcation with respect to other social groups. In the coffee break, I'm still together with my colleagues. At lunch I'll be more selective. I don't want to eat with just anyone, and in many cases who to meet for lunch is already arranged and also in what kind of setting: very informal or – becoming increasingly rare today – formal. The evening meal is reserved outright for special meetings with specially selected people. In the same way, we let our social media milieu share in who we meet where and for what. For many young people today, it is a more attractive proposition to visit a new restaurant and post pictures of it than to go to a concert.

Food – a political issue

But it is not only in terms of identification that food has now outstripped music. While music and music styles have become more permeable, more informal, more spectacular and more apolitical in recent decades – with the exception of a few dedicated artists – food is increasingly becoming a political issue. Michelle Obama in the US and Jamie Oliver in the UK for example are committed to healthier food in school canteens and work to encourage young people to get more exercise and have a healthy lifestyle. Diseases caused by a poor diet such as diabetes or cardiovascular disease give rise to high healthcare costs for the taxpayer, and the issue of whether GMOs should or should not be allowed are a matter of heated debate at regular intervals.

Against the loss of control

But where is the origin of our obsession with food to be found? Tech-savvy millennials – the generation born between 1980 and 1999 – and their use of social media channels are often cited. What drives this generation to share pictures of their lunch with their friends? What is the appeal of looking at pictures of other people's lunch? One explanation might be that in the US in particular, many people are confronted with

[30] Bloomberg (28.03.2017). «Once We Listened to the Beatles. Now We Eat Beetles.». Online: www.bloomberg.com/view/articles/2017-03-28/once-we-listened-to-the-beatles-now-we-eat-beetles

We can say it without exaggeration: social media has revolutionised our relationship with food.

an unstable economy and little in the way of promising job offers after completing their education. In food, they find support, comfort, identity and control. With their choice of food, they can again feel – at least a few times a day – as if they have part of their life completely under control.

Yearning for the real

Millennials are changing the food landscape fundamentally. Where in the past low-fat or low-carb were considered the ultimate in healthy eating, more value is placed today on natural, organic and unprocessed products.[31] There are more than 22 million public posts under #organic on Instagram, of which in addition to cosmetics, most are pictures of food and drinks. Generation Y gives a lot of thought to what it is putting into its body, and therefore has a big influence on the range and value of natural products.

The need for the real, for authenticity and naturalness – termed "romance" – can be under-stood as a contrary trend opposed to the progressive digitisation and quantification of our eve-ryday life and our body. The concept for FICO Eataly World, which opens in Bologna in au-tumn 2017, is based on these needs. In addition to the restaurants and shopping facilities in the 80,000 square metre theme park, there is much to learn about different production methods, biodiversity and Italian food culture "from field to fork".[32]

Overindulgence on screen

We can say it without exaggeration: social media has revolutionised our relationship with food. This can be seen for example in South Korea, where food is traditionally celebrated within the family circle. The Korean word for family means "those who eat together" and many Koreans do not like to have to eat alone.[33] Because the number of single households is growing, working hours are long and many people are moving away from home, more and more Koreans are nevertheless eating alone. From all of this, the "mukbang" trend has emerged on social media, where you can watch and listen to young people as they eat, and communicate directly with the stars of the scene through a chatroom. So you don't feel so lonely when eating alone at home.

[31] National Geographic, The Plate (29.12.2015). «How Food-Obsessed Millennials Shape the Future of Food» Online: theplate.nationalgeographic.com/2015/12/29/how-food-obsessed-millennials-shape-the-future-of-food

[32] Online: www.eatalyworld.it/en

[33] CNN (03.02.3014). «South Korea's online trend: Paying to watch a pretty girl eat». Online: edition.cnn.com/2014/01/29/world/asia/korea-eating-room

For the stars of the mukbang scene, this is not just a hobby to relish: their overindulgence on screen can earn them up to 9,000 US dollars a month[34] Interestingly, this form of entertainment has a particular appeal for people who have a strained relationship with food or are on a diet. It is even said that there are people who have successfully overcome an eating disorder by watching mukbangs and again experiencing how enjoyable food can be.[35]

In Europe too, you can now hardly escape the food mania on Facebook, Instagram and YouTube. Someone is always sharing a new picture or video of food – whether it's a photo of their morning coffee, a blog post on the latest gourmet hype or a video with simple recipes to try out. The "Dirty Bones" restaurant in London was even designed with the Instagram universe in mind. Plenty of space and good lighting ensure the right setting, while Instagram kits with a wide-angle lens, LED light and mini tripod help guests to get the perfect snapshot. Aside from that, it is also fair to claim that without social media, stars like Jamie Oliver or Gordon Ramsay would never have attained the worldwide popularity they enjoy today.

Always and everywhere

But it is not only on social media that food is becoming ubiquitous. No matter where you go, whether in the office, at the gym, buying furniture or at the airport, everywhere you look you will find food on offer, advertising or opportunities to order stuff online. Furniture retailer IKEA has long since made a name for itself with its meatballs and hot dogs. So much so in fact that 30% of all visitors make the pilgrimage to the Swedish furniture giant only for the food.[36] Now, the company has recently opened its own restaurants and cafes, but without the furniture department next door. There were already pop-up concepts in London, Paris and Oslo. Whether and when the first fixed location will be opened remains unclear.

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[34] The Huffington Post (05.05.2014). «Food And Social Media — A Complicated Relationship» Online: www.huffingtonpost.com/christopher-holmberg/food-and-social-media-a-c_b_4898784.html

[35] CNN (03.02.3014). «South Korea's online trend: Paying to watch a pretty girl eat». Online: edition.cnn.com/2014/01/29/world/asia/korea-eating-room

[36] Fortune (18.04.2017). «Ikea Might Open a Standalone Restaurant So You Can Eat All the Swedish Meatballs You Want». Online: fortune.com/2017/04/18/ikea-standalone-restaurant-meatballs

Food Touchpoints in Everyday Life

What are the touchpoints with food that occur in everyday life?[37]
As an example, a Friday in the life of a young, single city dweller with a desk job.

EVENT	FOOD TOUCHPOINT
Alarm goes off, check social media	Food porn on Instagram, new recipe videos on Facebook and YouTube, friend›s suppers on Snap-chat
To the gym on the bus	Eat a small snack on the way; ads for restaurants and chocolate bars on public transport
Short training session in the gym	Vending machines with energy bars and isotonic drinks available
Buy coffee and breakfast on the way to the office	Starbucks, bakery, coffee cart, canteen?
Short break in the cafeteria	Snacks such as fruit, chocolate and croissants available. It's a colleague's birthday and they brought a cake
Check social media	Friends and celebrities post pictures of their breakfast with latte art, avocado toast and overnight oats
Lunch break	Canteen, take-away, delivery service, restaurant: the selection is huge!
Food coma in the afternoon	Get coffee again and have chocolate snack: sugar and caffeine against tiredness
Happy hour rendezvous	Two, three drinks and some snacks like nuts or chips that happen to be lying around
At home the fridge is empty. Do some quick shopping or just have something delivered?	Shop! So a quick trip to the supermarket on the way home. There's a tempting display of sweets beside the checkout.
At home but run out of energy for cooking	Order something that looks healthy with an app, a cool drink helps while waiting
Friends want to go to the cinema	There's popcorn and sweet drinks on sale right after the ticket counter that cannot be ignored, and ads for ice cream everywhere
After the film, straight on to a bar	Two or three more drinks
Case of the munchies on the way home	Fast food or a kebab will help here against the hangover in the morning
Play a game on the phone in bed before falling asleep	Candy Crush! Sweets must be made to disappear
Sleep time	Will even the dreams be about food?

Source: GDI, inspired by www.fooducate.com

Food is becoming the new pop
Food will continue to gain in importance in the future as it permeates all areas of our lives, and our obsession with food will continue to grow. Food, in other words, is becoming the new pop – or to put it more forcefully: the old pop culture is dead, the new pop culture is food pop.

What is the situation in Switzerland? The figures show that in Switzerland, less money is spent on food, drinks and going out to bars and restaurants as a percentage of household income than a few years ago. However, the absolute amount in francs, independent of income, is rising.[38] The relative decline in spending on food is therefore not due to less interest in food, but rather to steadily rising incomes and the resulting higher total expenditure. While spending on food is also increasing, it is less than the total expenditure, which is why the percentage share is falling.

FOOD AND LANGUAGE

Alongside everyday life, language is also strongly influenced by food, especially when it comes to idioms. Each language has its own food-related phrases, and they often reveal something about the culture of the region from which they spring. These figures of speech often relate to foods that are common in the local culture. In Germany, an example of this would be "Alles hat ein Ende, nur die Wurst hat zwei", or "everything has an end; only the sausage has two"[39], while a French speaker might suggest that someone "s'occuper de ses oignons" – "take care of his onions", or mind his own business. In Japan, the less fortunate might complain about "hiyameshi o kuu", which literally translates as "eating cold rice" but means being shunned or left out in the cold, and a Swede for whom everything seems easy is said to be "glida in på en räkmacka", or "sliding in on a shrimp sandwich".[40] No doubt you'll have your own favourites in English. Think about it. It's a piece of cake.

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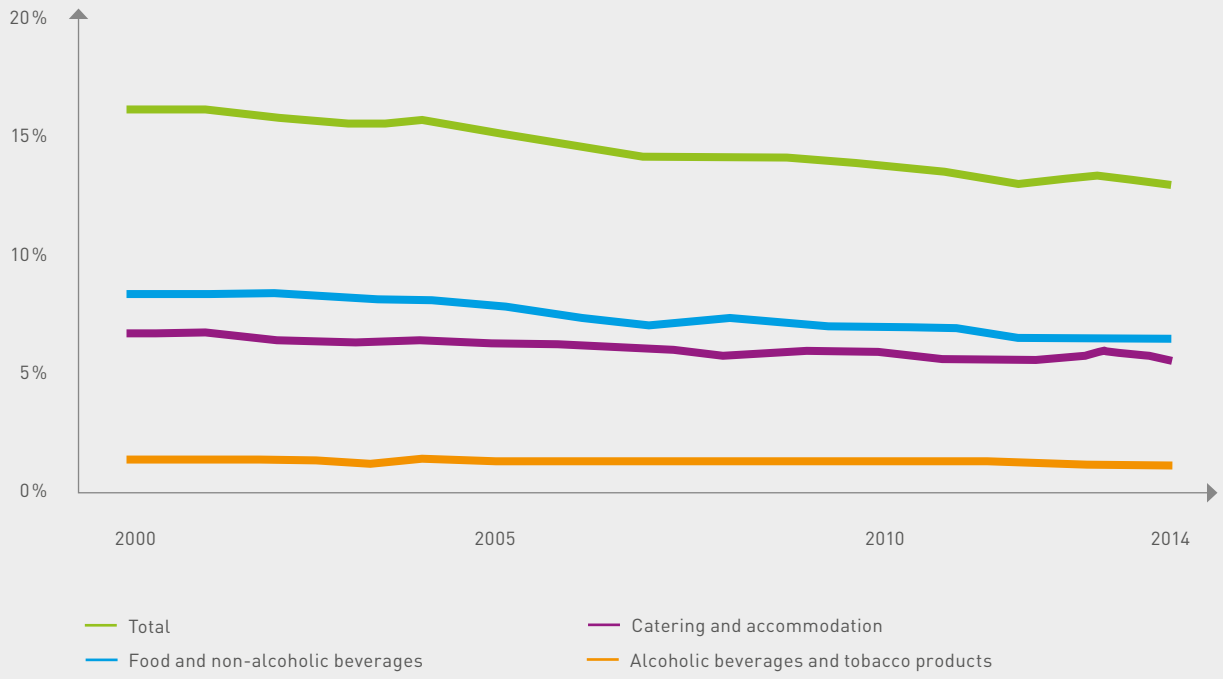
37 Fooducate (26.05.2016). «Food is Everywhere, and That's Not Good". Online: www.fooducate.com/app#!page=post&id=5746E381-874D-559D-4D35-B55B90ED1722

38 Federal Statistical Office. Online: www.bfs.admin.ch/bfs/en/home/statistics/economic-social-situation-population/income-consumption-wealth/household-budget.html

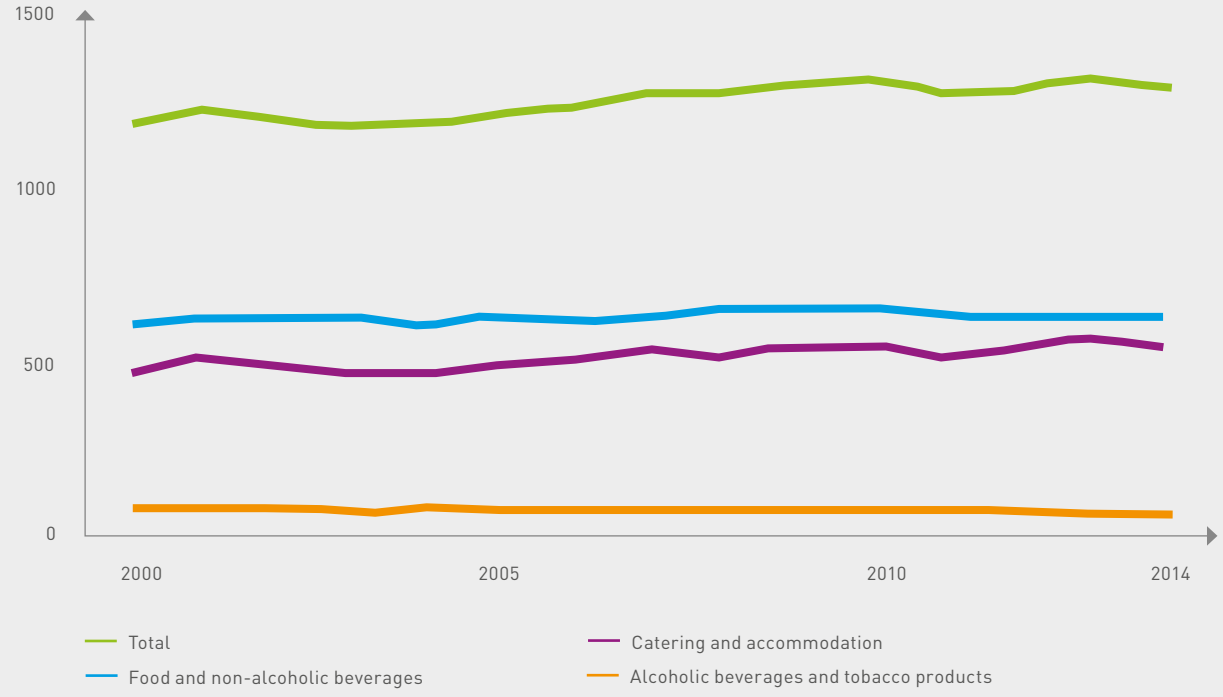
39 Sinnvoll Gastro (20.05.2015). «Redewendungen rund ums Essen - Part 2». Online: www.sinnvollgastro.ch/redewendungen-rund-ums-essen-part-2

40 The Guardian (17.10.2012). «Foodie figures of speech: a world of edible idioms». Online: www.theguardian.com/lifeandstyle/wordofmouth/2012/oct/17/foodie-figures-speech-world-edible-idioms

Spending as a percentage of income



Spending in Swiss francs per month



Source: GDI, data from www.bfs.admin.ch

FOOD THOUGHT LEADERS

Food is becoming the new pop, and pop culture always has its superstars. Who are the cen-tral figures here? How are they connected to each other? Who dominates the web, and who is of central importance on Wikipedia? To try to answer these questions, we conducted a network analysis.

The network of Food Thought Leaders on the web (see chart on p. 34) reveals a very heterogeneous and culturally diverse range of influencers:

NETWORK ANALYSIS WITH CONDOR

With the Condor software tools by Galaxyadvisors, you can comb the Internet for information in various ways (see www.thoughtleaders.world/en/method): You can use Twitter to analyse the wisdom (or madness) of the crowd, but because only the most topical issues are discussed there, Twitter was ignored for the Food Thought Leaders analysis. For its web analysis, Condor focuses primarily on surveying the (paid) expert knowledge available on blogs and online news portals. The Wikipedia analysis by contrast finds the (intrinsically motivated) knowledge of the swarm, which changes only slowly.

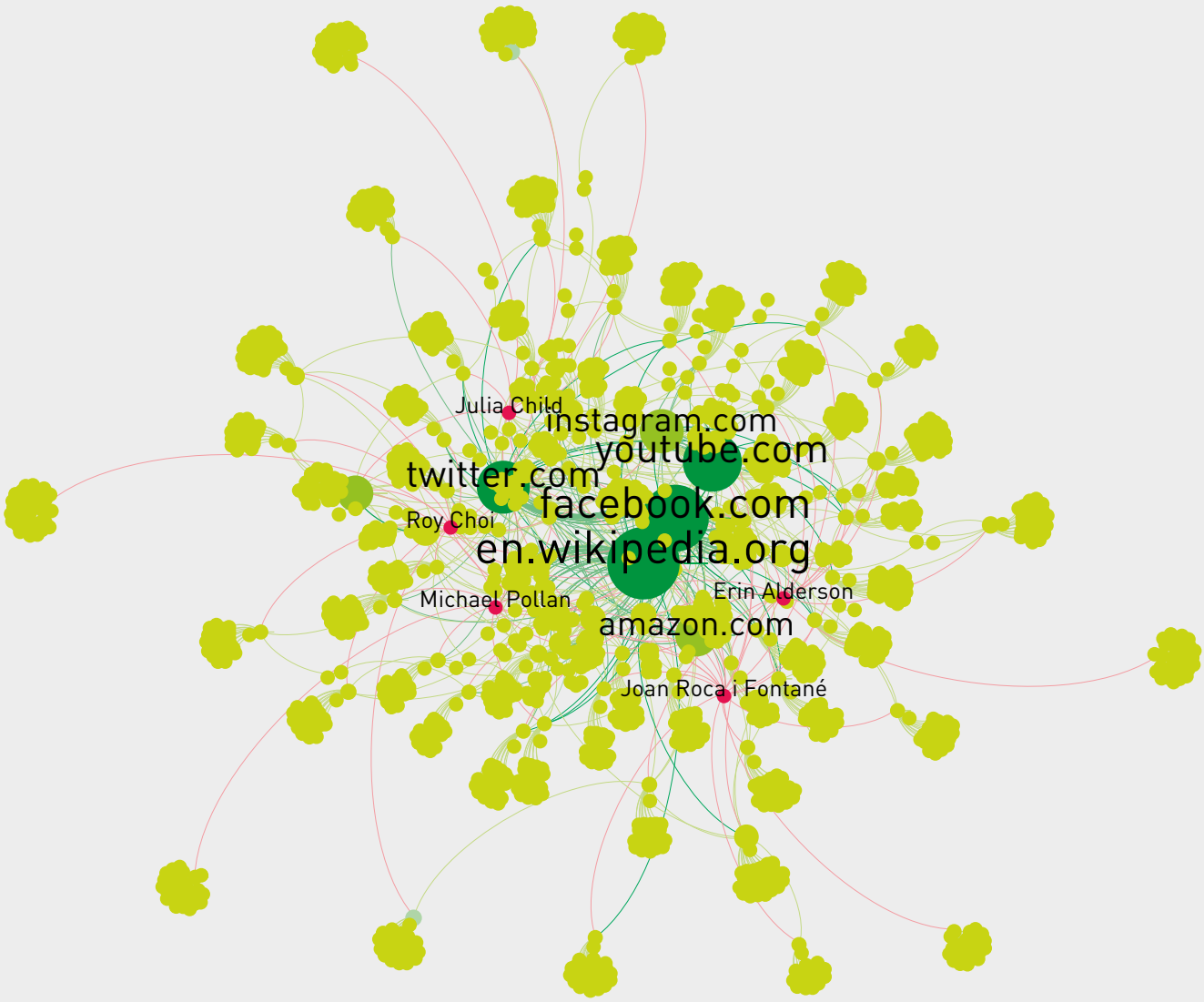
At the outset, GDI drew up a list of important people from the world of food, including star chefs, TV chefs, professors of nutrition sciences, restaurateurs and food bloggers. We looked on both the web and Wikipedia to find the people occupying the central positions on the network, who are therefore most prominent. For the top five in each case, we conducted another network analysis to see how these people are linked to each other.

The network analysis shows that people in the food sector are discussed mainly on social media like Twitter, Facebook and YouTube. While online news portals such as The New York Times, Los Angeles Times and Time Magazine are also on the network, they lag far behind social media. Many Food Thought Leaders therefore owe their prominence to the new media, which can spread information quickly.

For bloggers such as Erin Anderson or the co-founder of the hip food truck movement Roy Choi, this is hardly surprising. For someone like Julia Child however, who died in 2004 – two years before the founding of Twitter – it is. Her prominence on social media is due on the one hand to the "Julia Child Foundation for Gastronomy and the Culinary Arts", which Child founded in 1995 before her death, and also to the 2009 film "Julie & Julia" with Meryl Streep as Julia Child In the main role. On the other hand, her central position on the web demonstrates Child's lasting influence on the culinary scene, and she continues to inspire many people and draw them closer into the world of cooking and eating.

After Twitter, most of the writing about Food Thought Leaders is to be found on Wikipedia. Wikipedia has long since become a standard reference work, and anyone with a substantial entry there has a certain degree of public prominence.

The Network of Food Thought Leaders on the Web



1. Julia Child
The most important style leader, a US chef and cookbook author (1912-2004) who also achieved international fame with her own TV cooking show. Julia Child lived in France for several years, where she found her passion for cooking. With her book "Mastering the Art of French Cooking", she adapted the complex cuisine of the French for the average American. Her heritage lives on.

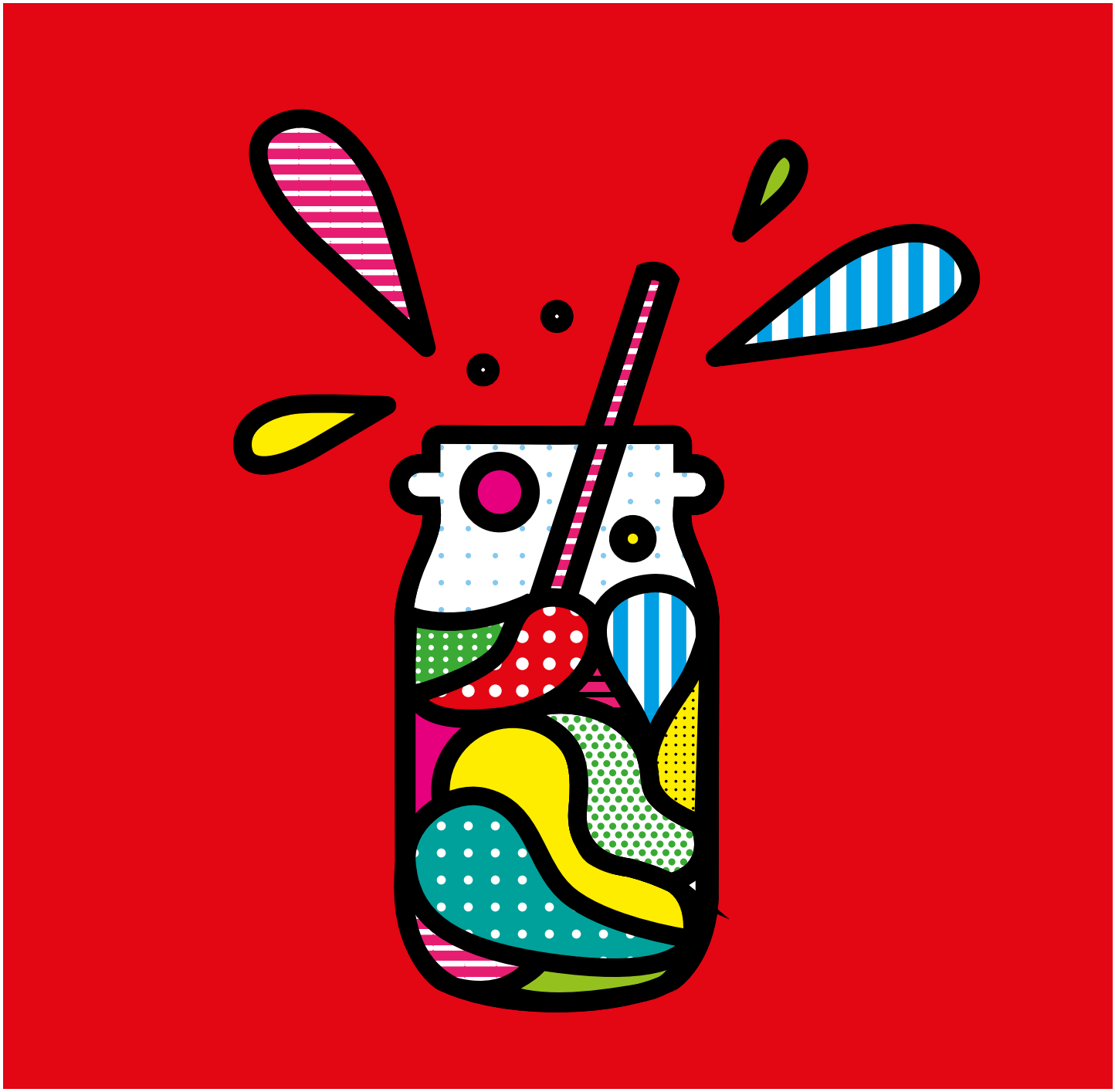
2. Erin Alderson
A photographer and food blogger from Sacramento, California. Her main focus on her blog "Naturally Ella" is on natural ingredients and vegetarian recipes. In addition to her blog and photography, she has also written two books.

3. Joan Roca i Fontané
Head chef at the Spanish three-star restaurant "El Celler de Can Roca" in Girona. In addition to the Michelin inspectors, Fontané has also won over other critics of his culinary skills. Most recently, Restaurant Magazine awarded him the Chef's Choice Award 2016.

4. Michael Pollan
A US journalist, author, activist and professor of journalism at the UC Berkeley Graduate School of Journalism. Pollan's books and articles on food, eating and human food culture have earned him several awards including the "George Orwell Award for Distinguished Contribution to Honesty and Clarity in Public Language".

5. Roy Choi
A Korean-American chef, who became well-known as the creator of the gourmet Korean taco truck "Kogi". He is regarded as one of the founders of the food truck movement, and also runs several restaurants. He was named one of the top ten "Best New Chefs" of 2010 by Food and Wine magazine, and is the first food truck operator to win that distinction.

Source: GDI, 2017

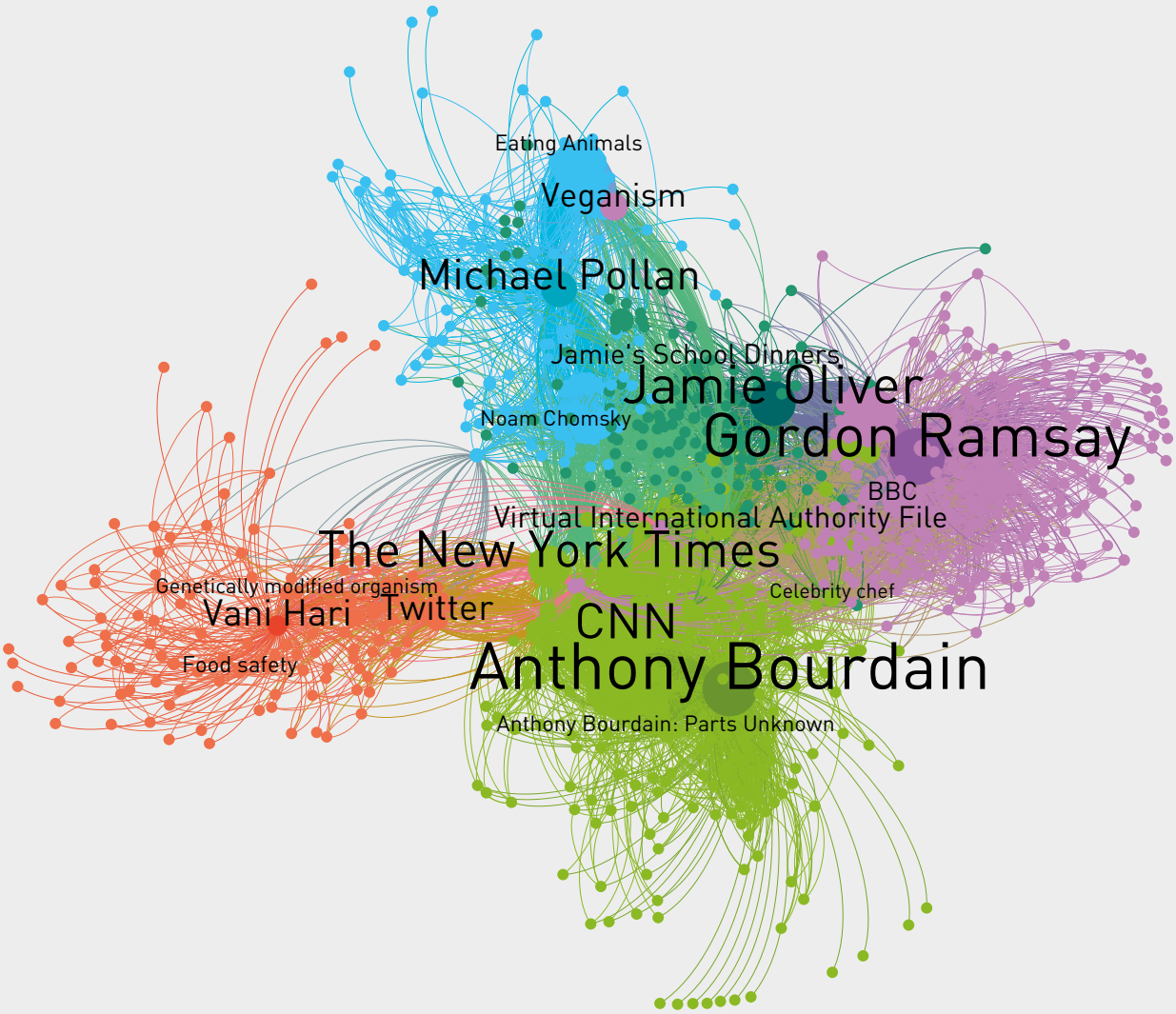


The most influential Food Thought Leaders on Wikipedia (see chart on p. 36) show a less heterogeneous picture than the Food Thought Leaders on the Web

With Galaxyadvisors' Condor software, we can visualise the relationships between different Wikipedia pages. This shows us how the Wikipedia pages for the five Thought Leaders are linked to pages on other ideas and people, and where thematic clusters are formed.

Cross-linked to almost all players are big sites such as IMDb, the Internet Movie Database, because most Food Thought Leaders appear in movies or series, or in The New York Times, one of the largest and most influential daily newspapers in the world. Other hubs of central importance are directories of national libraries and library associations, for example the "Virtual International Authority File" or the "Integrated Authority File". Inclusion in such directories indicates that the person has a certain degree of prominence. In terms of their influence on the food world, however, this does not tell us a lot. Where it gets more interesting is when we take a closer look at the individual thought leaders.

The Network of Food Thought Leaders on Wikipedia



1. Anthony Bourdain
An American chef, author and TV personality. He has worked in countless top restaurants, written the bestseller "Kitchen Confidentials" and appears on TV in "No Reservations" and "Parts Unknown". He has more than five million fol-lowers on Twitter and is regularly featured in the front ranks of lists of the most influ-ential chefs.

2. Gordon Ramsay
A British chef, TV chef and restaurateur. His restaurants have been awarded up to 15 Michelin stars at times. Ramsay is well-known to a wide audience through the TV shows "Kitchen Nightmares" and "Hell's Kitchen", in which his per-fectionism and fiery temper turned him into a cult figure.

3. Jamie Oliver
A British chef, TV chef and restaurateur. Oliver became famous through his TV debut "The Naked Chef", where he struck a chord with his audience with the simplicity of his ingredients and preparation of his recipes. He is committed to would-be chefs and healthy eating with his involvement in various projects such as "Jamie's Kitchen" and the "Feed me better" campaign.

4. Michael Pollan
A US journalist, author, activist and professor of journalism at the UC Berkeley Graduate School of Journalism. Pollan's books and articles on food, eat-ing and human food culture have earned him several awards including the "George Orwell Award for Distinguished Contribution to Honesty and Clarity in Public Lan-guage".

5. Vani Hari
A US blogger (Food Babe), author and activist. She is a critic of the food industry and an advocate of healthy eating. Her campaigns have led large companies such as Chick-fil-A or Kraft to reconsider or modify the ingredients in their products. However, she in turn is also the subject of criticism from scientists for her pseudo-scientific ideas and "chemo-phobia".

Source: GDI, 2017

Connections with journalists, organisations and companies

Anthony Bourdain occupies a central position in the network, which is why he took first place as the Wiki Food Thought Leader. There is a cluster of television journalists, radio broadcasters and correspondents closely linked to Bourdain. Bourdain is known not only for his restaurant and books but also chiefly through his television programmes, including "Anthony Bourdain: No Reservations" or "Anthony Bourdain: Parts Unknown", in which he travels the world to explore local cultures and eating habits. His close connection to people and institutions in the TV industry is therefore easy to understand.

Also linked to a cluster of journalists is Michael Pollan, himself a journalist and professor at the Berkeley Graduate School of Journalism. In his journalist cluster, however, there are fewer TV journalists and more journalists who write as he does for newspapers and magazines. Since Pollan is an advocate of sustainability and a healthy diet, he is also closely linked to the topics of veganism and vegetarianism and the organisations associated with them, such as Britain's Vegetarian Society.

Gordon Ramsay and Jamie Oliver come from the same neck of the woods: both are British, both are celebrity TV chefs and both have several restaurants, so they are naturally close to each other in the network. The cluster you see between the two sides of Ramsay and Oliver consists mainly of dishes and recipes that both present in their cooking shows or books. Surrounding them are Ramsay's and Oliver's respective restaurant chains, TV shows and campaigns.

Vani Hari is found in a rather loose network, and there are no clusters. As a food activist, she is linked with pages from different areas: media companies such as Twitter, Time Magazine or The Wall Street Journal, food companies such as Kraft, Anheuser Busch or Subway, and pages related to food safety, genetically modified food, antibiotic use in livestock or the FDA (US Food and Drug Administration).

Social media as a guarantee of success

So what is the recipe for successfully becoming a food star? A presence on social media platforms is almost certainly the most important ingredient! Twitter, Facebook and YouTube are opening up new avenues for stars to communicate and interact directly with their followers. Other ingredients in the recipe for success are the films or television shows through which food celebrities can reach a wide audience. For ambitious hobby chefs, most Food Thought Leaders also make their knowledge and expertise available in book form. So it comes as no surprise that in addition to social media and Wikipedia, amazon.com also occupies a central position in the network.

What happens in the belly, doesn't stay in the belly

The human body is an integrated whole in which the individual organs, vessels and cells interact and influence each other in a highly complex manner. The substances we put into our body as part of our diet therefore cannot be considered in isolation. What lands in our stomach and ultimately in our gut has a decisive influence on our physical wellbeing. This knowledge is however not new, and has been addressed in various nutritional doctrines and teachings, old and new, around the world.

The spectrum of nutritional teachings is enormous. On the one hand, there is nutrition science, which is located between the fields of medicine and biochemistry and deals with the principles, composition and effects of nutrition on humans. Between food and pharmaceuticals, there are also nutrition-based disease therapies and functional foods to be found. Examples of this are probiotic yoghurts or fruit juices enriched with vitamins. On the opposite side, the teachings are based less on scientific knowledge and more on experience or tradition. They provide guidance on "proper" nutrition in line with religious or philosophical systems. Examples include the Bircher-Benner diet, the Paleo diet and macrobiotics. In between are ancient teachings such as Ayurveda or traditional Chinese medicine (TCM), along with more recent concepts such as superfoods or light products. While these nutritional teachings may have a scientific background, they do not provide sufficient evidence – from the Western sci-entific standpoint – to be considered "true".

The diversity of nutritional doctrines and teachings makes it clear: our body, our mind and our diet interact in a very complex way we are not yet anywhere near understanding in their entirety.

Setting our sights on bacteria and fungi

An important part of the body, which is only slowly beginning to be understood today, is the human microbiome. A biome is defined as a community of flora and fauna occupying a major geographical area (such as a tropical rainforest). The human microbiome in the broader sense is the totality of all microorganisms living in and on the human body. In the narrower sense, the human microbiome is defined as the totality of all microbial genes or genomes (DNA) in the human organism. Experts speak of the "metagenome".

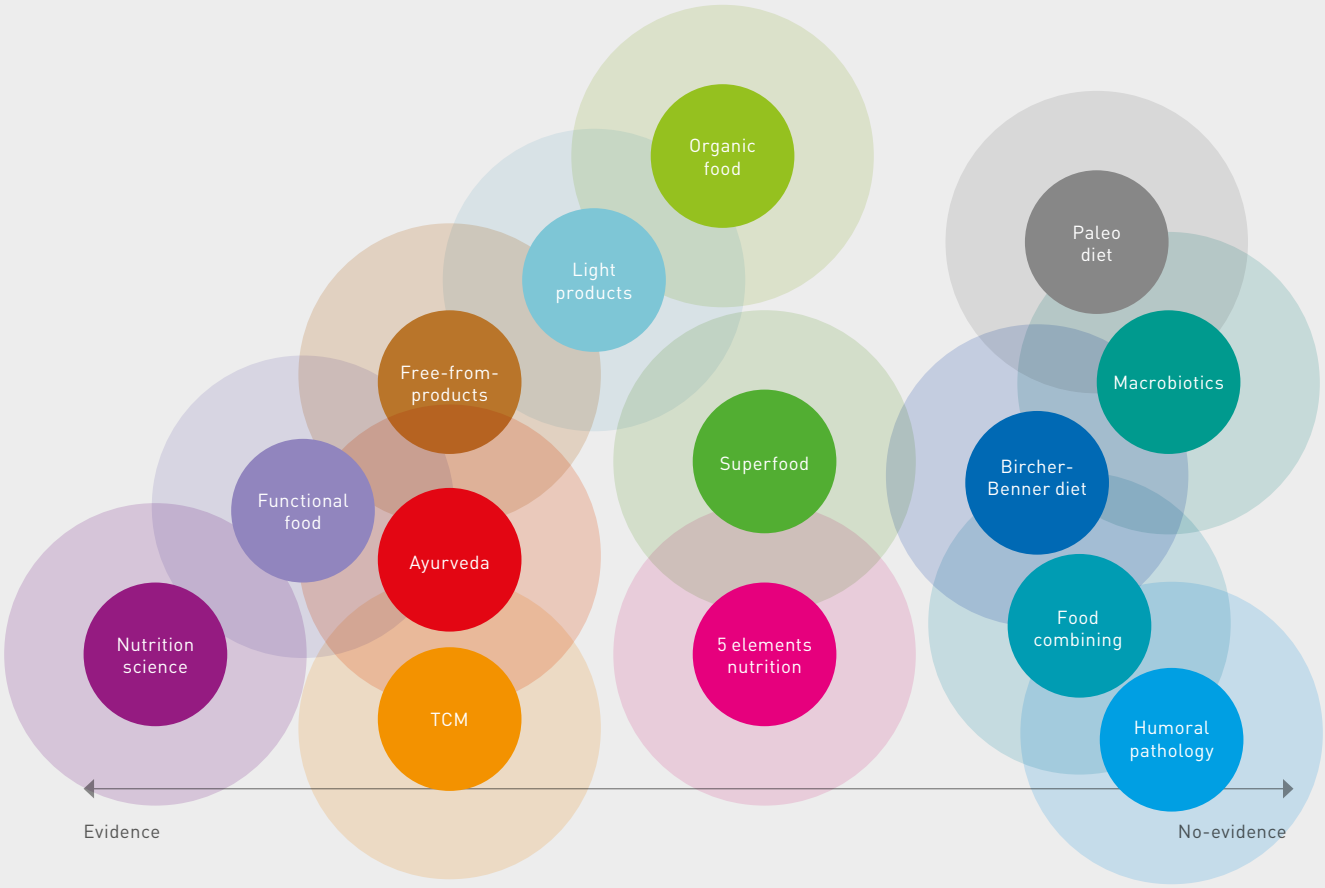
HEALTH CLAIMS

The incredible abundance of different – and sometimes contradictory – nutritional doctrines can be confusing for many consumers. Ultimately, however, we can all decide for ourselves the principles we want to nourish ourselves on. For companies, the situation is somewhat more complicated. Deciding what health claims are allowed in advertising messages is a balancing act that requires a delicate touch in the interpretation of food law. To put an end to the uncontrolled proliferation of unverifiable claims, the EU published a list of permitted health claims in May 2012. The list has been continually expanded since then.

Some manufacturers see this list less as a constraint, and more as an opportunity to make even more enticing claims for their products. Because as long as the right vitamins, minerals or other substances on the list are added, almost any product can be advertised with "helps digestion" or "protects the cells". Probiotic yoghurts for example can no longer be touted with "strengthens the immune system". But if vitamin C is also added to the yoghurt, the reference to the immune system is allowed again.[41]

[41] Verbraucherzentrale (13.06.2017). «Lebensmittel mit Gesundheitsversprechen». Online: www.verbraucherzentrale.de/lebensmittel-mit-gesundheitsversprechen

Overview of nutritional doctrines[42]



Nutrition science
A natural science concerned with the principles, composition and effects of nutrition.

Functional food
Foods that are enriched with additional ingredients and promoted as having a positive effect on health.

Traditional Chinese medicine (TCM)
A style of medicine developed in China over a period of more than 2,000 years. TCM is considered an alternative or complementary approach to medicine.

Ayurveda
A traditional Indian healing art. Ayurveda is not a single therapeutic method, but rather a holistic system within the realm of traditional alternative medicine.

Free-from-products
Foods containing no lactose or gluten. For people with food intolerances.

Light products
Foodstuffs, drinks and tobacco with a reduced content of ingredients regarded as unhealthy, such as fat, sugar, ethanol or nicotine.

Organic food
Eschewal of conventionally produced foods in favour of bio-products from organic farming. Positive effects on health have not yet been demonstrated.

Superfood
Marketing term for foodstuffs with alleged health benefits. In some cases, the positive effects on health are based on scientifically proven associations.

5 elements cuisine
The transfer of parts of traditional Chinese medicine to the customary diet in the Western world. It is based on the theory of the five elements: wood, fire, earth, metal and water. However, it differs significantly from dietetics according to the principles of TCM.

Paleo diet
A form of nutrition based on the presumed diet of the Paleolithic period. The Stone Age diet consists exclusively of foodstuffs that are assumed to have been available as early as the Paleolithic – with no milk products, no cereal grains, no processed foods.

Macrobiotics
An approach to diet and lifestyle founded by Japanese author Georges Ohsawa and based on Taoist teachings and Asian traditions. Macrobiotics contradicts accepted scientific and medical knowledge. Its claim to be able to heal all diseases is considered to be refuted.

Bircher-Benner diet
Max Bircher-Benner, a Swiss doctor and nutrition reformer, developed Bircher muesli and is considered a pioneer in the area of wholefoods. Even as it was being developed, Bircher-Benner's nutritional doctrine was met with scepticism and rejection among doctors and scientists, as it contradicted biochemical knowledge.

Food combining
A form of nutrition developed by William Howard Hay at the beginning of the 20th century in which protein-rich foods and carbohydrate-rich foods are not eaten together at the same meal. The theory underlying it is considered "scientifically untenable".

Humoral pathology
A medical doctrine that was first developed in the Corpus Hippocraticum around 400 BC as an explanation of general bodily functions and a conception of disease. Until the advent of cellular pathology in the 19th century, it remained the dominant approach to medicine.

[42] This overview makes no claim to be complete and should only provide a rough overview of the breadth of the various nutritional doctrines.

Source: GDI, 2017

The human body is made up not only of the individual cells of a multicellular organism, in other words of human cells, but also of microbial cells of unicellular organisms such as bacteria or fungi. The ratio of multicellular cells to unicellular cells is a matter of dispute: early estimates suggested a ratio of 1:10, while more recent estimates assume a ratio 1:3 or even 1:1. The majority of the microorganisms in the human body are located in the colon, where bacteria are partly responsible for digestion. The intestinal microbiota, long termed intestinal flora, is the subject of enormous attention in the media. Apart from the digestive organ, microorganisms are also found on the skin, in the mouth and nasal cavity, the mucous membranes and the genitals.

Research at the very beginning

The composition of the intestinal flora also appears to be important for physical wellbeing and health. The bacteria in the intestine exploit indigestible constituents of food (including dietary fibres) and supply the intestine and body with additional energy. The bacteria can also produce some vitamins, although these are useful to humans only in very limited quantities. They also play a role in the metabolism of toxins or drugs and help train our immune system.[43]

Bacteria produce various different substances such as organic acids, gases or fats, and thus also have an influence on the metabolism of the human body they colonise. Health issues ranging from excess weight and nutrition deficiencies to nervous disorders and chronic bowel problems are all associated with differences in intestinal flora. The extent to which these bacteria are causal factors (which came first, the chicken or the egg?) has not yet been settled conclusively by the research.

The "Human Microbiome Project", an initiative of the US National Institute of Health, now wants to identify and characterise the human microbiome. The initiative was launched in 2008 as a five-year project and endowed with a total budget of 15 million US dollars. It reached its first conclusion in 2012, presenting a reference database for the gene pool of the microbiome of a healthy adult. The project is ongoing.[44] There are now also various major initiatives in Europe devoted to sequencing the microbiome and its function.

Individual analysis

On the basis of the scientific findings of the Human Microbiome Project, a range of com-panies and organisations are now offering a new service: microbiome analysis, for example the SmartGut test offered by US company uBiome. SmartGut is a sequencing-based clinical microbiome screening test. The test is ordered by a doctor, the samples are taken at home and analysed in the laboratory. Customers are provided with detailed information about their per-sonal microbiome in order to help them better understand their own intestinal flora and its influence on health and wellbeing.[45] Another goal of this sampling is to gain further scientific insights into the human microbiome.

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[43] Enders, G. (2014). «Gut: The Inside Story of Our Body's Most Underrated Organ».

[44] The National Institutes of Health Common Fund Human Microbiome Project. Online: www.hmpdacc.org/hmp/overview

[45] Online: ubiome.com

For the record: human beings are approximately 99.7% genetically identical, but the 0.3% can make all the difference.

Interestingly, there is a bridge to pop culture to be found here too. The symbiosis between the human body and the organisms in its microbiome is reminiscent of the midi-chlorians in Star Wars. Midi-chlorians are a microscopic life form found in the cells of all living organisms. They are an important part of the "Force" that plays a crucial role in the Star Wars universe. The Force is an energy field that surrounds, permeates and connects all living entities in the galaxy. Without it, no life is possible. The Force is what gives a Jedi his strength. While all living beings have a certain sense of the Force, it is much more pronounced in Jedis because they have a higher concentration of midi-chlorians in their cells.

The midi-chlorians allow their hosts to make contact with the power. Unlike many other cell organs, they produce force energy rather than chemical energy. Moreover, they can be influenced by the mind state of the host. A trained Jedi can therefore use the Force to influence his environment, move objects without touching them, or manipulate the thoughts of weaker people.[46]

There is no evidence so far that the human microbiome might enable its host to control some form of cosmic energy. However, the nature and composition of the microorganisms in the human body do seem to have a major influence on the health and general wellbeing of their host.

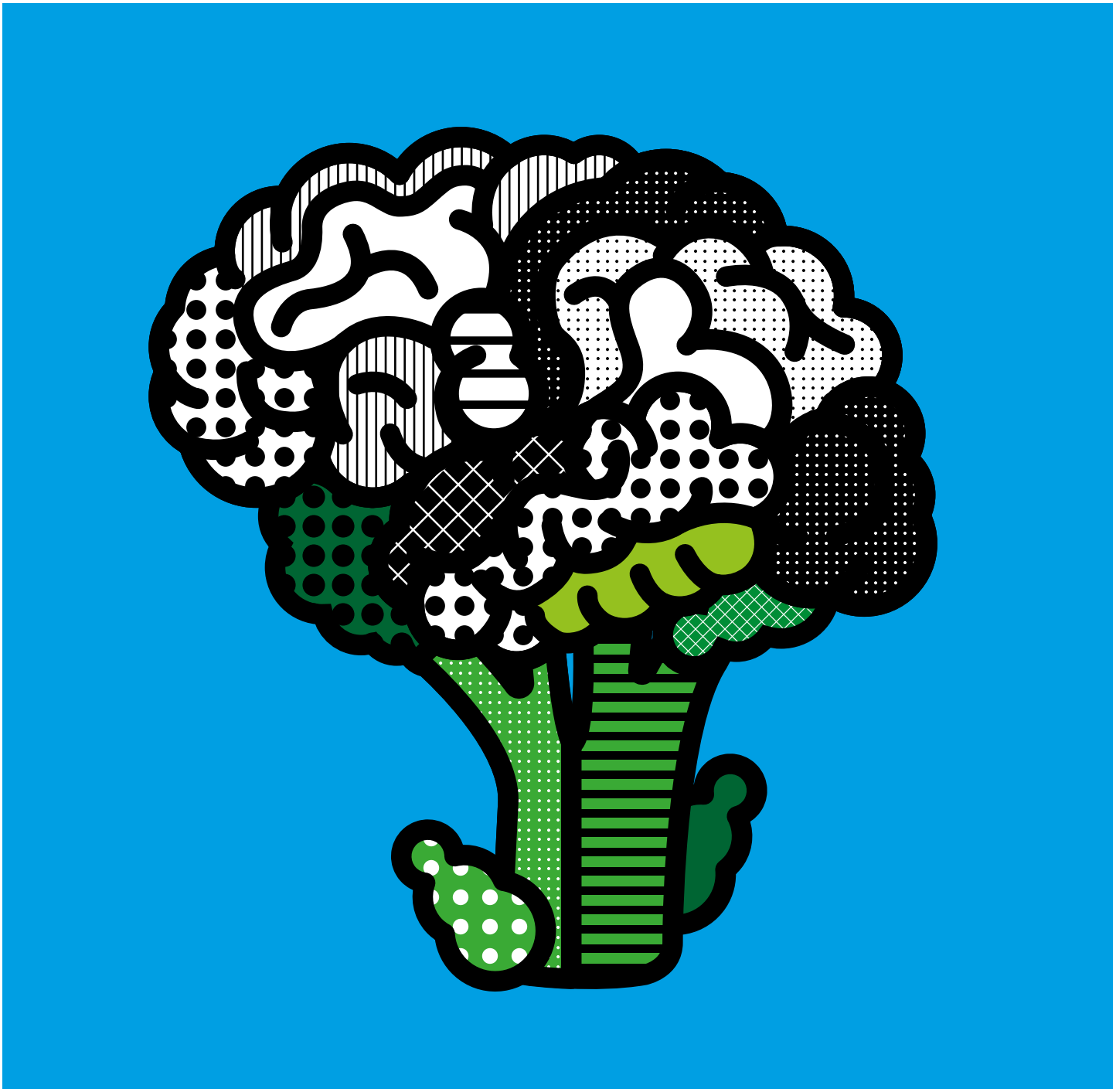
Compatible or incompatible – the genes decide

The composition of the bacteria in the gut is not the only factor that influences the way in which food is processed in the body. The genetic constitution of every human being also has a major influence on how the organism works. For a healthy diet, the crucial factors are then not only what you eat, but also who is eating it.

For the record: human beings are approximately 99.7% genetically identical, but the 0.3% can make all the difference. How well someone tolerates coffee or alcohol, whether lactose is on the menu, or how well vitamin C is absorbed from food is – at least in part – codified in the genes.[47] This can also explain why some people tend towards being overweight despite athletic activity and a healthy diet, while others who live on fast food and take little exercise are lean and slim.

[46] Online: starwars.wikia.com/wiki/Midichlorian

[47] GEO Wissen Ernährung (2016). Nr. 1, «Gesundes Essen: Was ist gut für mich – und was nicht?». pp. 112-117.



Diet made to measure

Nutrigenetics is a relatively recent research discipline. It is concerned with the relationships between diet and genetics. All hereditary information in a human being is found in the human genome, specifically in the chromosomes and the DNA in the cell nuclei. A very small genome is also found in the cell mitochondria. The "Human Genome Project" was an international research effort launched with the goals of fully sequencing the human genome and providing researchers with tools to help them understand the genetic factors involved in diseases in order to pave the way for new strategies for diagnosis, treatment and prevention. The project started in autumn 1990. By April 2003, the human genome was fully sequenced.[48]

[48] National Institutes of Health (Oktober 2010). «FACT SHEET – Human Genome Project». Online: report.nih.gov/NIHfactsheets/ViewFactSheet.aspx?csid=45&key=H#H

The discipline of nutrigenetics also takes advantage of the findings of the Human Genome Project, using genetic tests in an attempt to further personalise diet and develop tailor-made nutritional plans. Made-to-measure plans of this kind may in the future replace general nutri-tional advice, which is based exclusively on average values.

From Artificial to Sm(art)

When you try to describe the needs of consumers, you sooner or later encounters two trends: the mega-trend of science and the contrary trend opposing it, romance. Science holds that with technological development, an ever-growing area of our daily lives will be measured and understood on a scientific basis. Software replaces hardware, data replaces things, and people want to constantly quantify and optimise. Our everyday lives and feelings are understood on a scientific basis. This triggers the counter-current of romance: the yearning for the real and authentic grows. We romanticise nature and long for an ideal world.

In terms of food, science means functional food or convenience. Many consumers are con-stantly on the move, always stressed out. They have to find something to eat quickly when they're on the go, so they resort to convenience products, which are often not particularly healthy or fresh. From this necessity for convenience products emerges the contrary trend of romance: food should again be natural, fresh, local. This can be seen for example in the trend towards vegetarian and vegan diets, in the do-it-yourself movement or in the growing number of slow food and farmers markets.

The science side of food has for a long time tended to have a bad reputation. Many people associate it with industrial foods such as tinned ravioli, powdered soup or microwave meals. But science also includes natural processes and processing methods. Frozen vegetables for example are considered to be processed, albeit only to a small extent. Pickled fruit, jams and marmalades, cured or smoked meat, wine and beer and fermented products such as yoghurt, sauerkraut or kombucha have also been processed, usually to extend the food's storage life or make it more tasty. The processing here is with natural processes, so is not perceived as industrial or unhealthy. For most people, science covers only artificial, industrially processed foodstuffs.

Scepticism about industrial food production
During industrial processing, foodstuffs generally pass through multiple production steps. Many consumers are sceptical about heavily processed products, usually with health or envi-ronmental concerns. Industrial products contain many additives. They have often been only recently approved, with little research into their long-term consequences. The additives include for example artificial flavourings, flavour enhancers, artificial colourants, sweeteners, preservatives or emulsifiers. Ready-to-eat meals in particular contain a large number of these additives, to extend the shelf life of the product for as long as possible. In the production of the starting products, artificial means are also used to help optimise the yield. Pesticides, fungicides, hormones or antibiotics are often used. This can have health consequences and lead to resistance to bacteria. In addition, intensive cultivation of the soil and monoculture farming deplete nutrients that are not replenished, with possible consequences including soil erosion and pollution of groundwater. Tak-

en together, these are not signs of a sustainable economy. [49]

Many consumers are uneasy about this industrial approach to the production of food. Con-fidence in the industry is increasingly being lost. This reinforces the trend towards natural, organic and fresh products. Transparency and control are becoming more and more important – consumer wants to know where their food comes from and under what conditions it was produced.

Science from the art scene

The same applies in reverse: as perceived by consumers, science is not always science. For some years now, a shift in consciousness has been taking place. Science today no longer comes only from the food industry, it is also increasingly coming from the art and hacker scene.

This development can perhaps be dated back to the 1990s, with the advent of molecular cuisine (also known as molecular gastronomy, modernist cuisine, avant-garde cuisine or ex-perimental cooking). Highly processed products were suddenly seen as trendy, chic and desir-able. In the case of "ElBulli", a restaurant on Spain's Costa Brava run by Ferran Adrià (one of the pioneers of molecular gastronomy) from 1990 to 2011, up to two million people tried to make a reservation every year – for a space with a capacity of just 8,000 guests. In Heston Blumenthal's "The Fat Duck" in Berkshire, England, where the dishes are also created using a scientific approach, the numbers wanting to visit are also huge: in 2011 alone, there were up to 30,000 calls for reservations every day. And that demand is exceeded by the "Noma" in Copenhagen.

With "Modernist Cuisine: The Art and Science of Cooking", the three researchers, inventors and masters of cuisine Nathan Myhrvold, Chris Young and Maxime Bilet created a six-part work that goes into the various different facets of scientifically inspired cooking, from its history to its techniques to a recipe guide. For curious and passionate hobby chefs, there is also "Modernist Cuisine At Home". Easy to understand, it offers an introduction to the scientific and technological aspects of cooking – even for cooks without a degree in chemistry or physics[50] – making this new culinary accessible to those who cannot get a table at one of the top restaurants.

Since the advent of molecular cuisine, cooking has been increasingly perceived as a scientific discipline. Its unusual new dishes with their unfamiliar textures, temperatures and forms along with the plumes of liquid nitrogen can be imagined less as the result of a cooking process and more as something coming out of a chemistry professor's laboratory. Ultimately, however, cooking is exactly that – physical process and biochemical reaction. Or, as Madonna put it singing about the forces of love in 1983: "physical attraction and chemical reaction."

Susanne Tobler also work according to this principle. In summer 2016, she launched the pop-up restaurant "Tastelab" on the Polyterrasse at ETH Zurich, designed to provide

[49] Union of Concerned Scientists. Online: www.ucsusa.org/our-work/food-agriculture/our-failing-food-system/industrial-agriculture

[50] Online: www.nathanmyhrvold.com/index.php/books

With biohacking, the focus is primarily on the second variant: people want to find out what the human body is capable of and where its limits are reached.

nour-ishment for both the stomach and the brain.[51] Under the motto "Cooking & Science – simply better food", science and food were brought together for four weeks in the heart of Zurich to transport guests into new worlds of taste.

Chief initiator Tobler, a physicist, has been self-employed with her catering company since 2014. In TasteLab, she is supported by other ETH alumni working in different fields of the natural sciences. The observation behind the project: our lives are being revolutionised by science and new technologies – but we still cook like our grandparents.[52] TasteLab showed that science can help to optimise even everyday dishes. Make the perfect espresso, cook a piece of meat to perfection or prevent the Hollandaise sauce from congealing once again.

Solving global problems with science

Science and food are not only fusing where people are looking to create effective new dishes or perfect ancient recipes. Science can help in the struggle against global problems such as hunger, disease or environmental damage. In the area of meat production in particular, there is a great deal of potential.

Industrial meat production is extremely resource-intensive, harmful to the environment and questionable with respect to the welfare of animals. Advanced scientific knowledge and new technologies are creating possibilities here for the development of products that without science could not possibly exist. In-vitro meat or plant-based burgers, for example, could replace regular meat and reduce meat production around the world. Memphis Meats from San Francisco has succeeded in producing the first chicken strips made from animal cells, and the chickens escaped unscathed.[53] The Israeli biotechnology start-up SuperMeat is pursuing the same idea: they want to produce chicken meat from cells whose production consumes 99% less land and 90% less water, reduces greenhouse gas emissions by 90%, and harms no animals.[54] A different approach to the same problem was chosen by Impossible Foods and Beyond Meat, who are producing deceptively genuine meat substitutes from plants, and here again: less land and water are consumed, fewer greenhouse gases are emitted, and no animals have to suffer or be killed.[55] [56]

[51] Neue Zürcher Zeitung (09.05.2016). «Die Poly- wird zur Pop-up-Terrasse». Online: www.nzz.ch/zuerich/wirten-und-wissenschaft-vor-der-eth-zuerich-die-poly-wird-zur-pop-up-terrasse-ld.18676

[52] Online: www.tastelab.ch

[53] Online: www.memphismeats.com

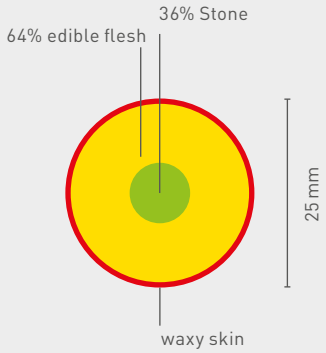
[54] Online: supermeat.com

[55] Online: www.impossiblefoods.com

[56] Online: beyondmeat.com

Modification of Foods

WILD PEACH, 4000 B.C.



71,0%
Water

8,1%
Sugar

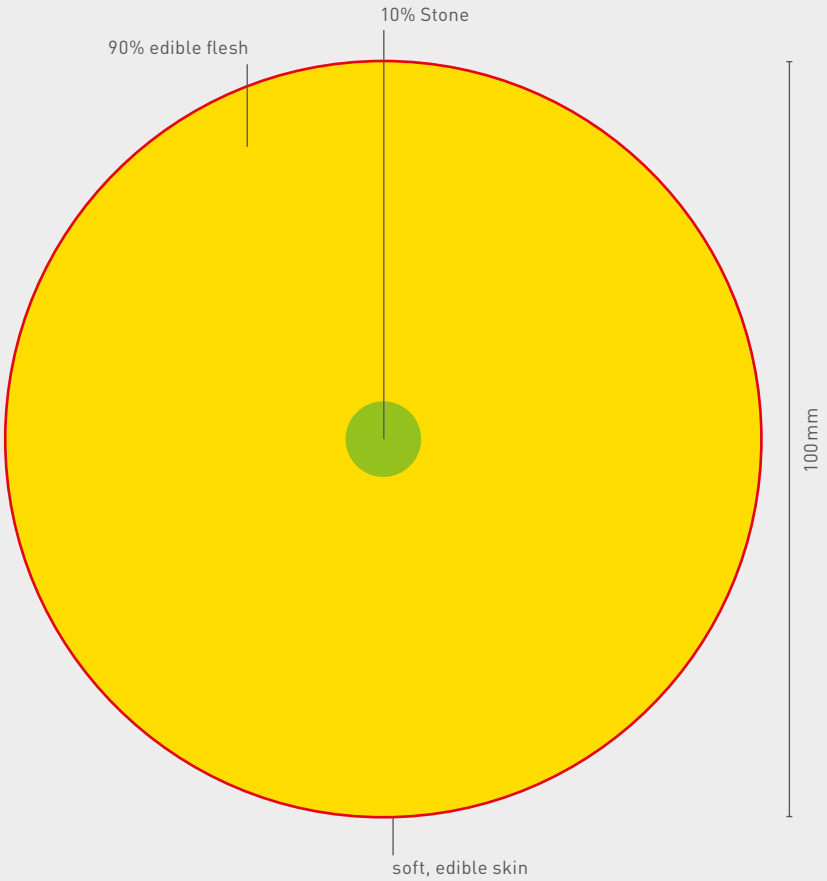
20,9%
Other

'earthy', 'sweet', 'sour' and slightly salty

3 known varieties

Only found in China

MODERN PEACH, 2014



88,9%
Water

8,4%
Sugar

1,7%
Other

'sweet', 'refreshing' and 'juicy'

~200 known varieties

Grown in 13 countries

Source: jameskennedymonash.wordpress.com

Where science once only made food "artificial", science-food today in the form of steaming watermelon caviar also comes across as "art", or becomes "smart" and pushes bio-hackers to their peak performance.

Testing human limits with biohacking

The hacking scene is a big fan of science. What hacking is basically about is finding creative solutions to problems – regardless of whether these are improvised solutions or experiments that explore the limits of the feasible. With biohacking, the focus is primarily on the second variant: people want to find out what the human body is capable of and where its limits are reached. The goal of nootropics, food supplements and smart drugs is to explore these limits and catapult the human body and brain into new spheres.

Many hackers live according to the principle of "work smarter, not harder". So if it's to make us smart, the food has to be smart too. Take for example the nootropic coffee from Hacker's Brew: organic coffee, coconut cream and cocoa are the basis, then a good dose of adaptogens (biologically active plant substances) and a caffeine with an extended half-life so that its effect lasts longer. Hacker's Brew promises full-day performance with the same amount of caffeine as a normal mocha drink.[57] As for the powder food Soylent – the ultimate nutritional hack – there's plenty of science behind that too: first, the question of which nutrients humans need to live had to be answered. Then these nutrients had to be extracted from the appropriate products, isolated and recombined, and a foodstuff developed from them. Without science, Soylent & Co. would not have been possible.

Given these developments, the perception of science is undergoing a process of constant change. Where science once only made food "artificial", science-food today in the form of steaming watermelon caviar also comes across as "art", or becomes "smart" and pushes bio-hackers to their peak performance.

Growing acceptance of science-food

The progressive acceptance of science in food is also evident on the Food Disruption Map on page xx: the more developed a technology is, the more likely it will be accepted by society. Laboratory meat and nutrigenetics are still in the laboratory stage and tend to be viewed rather critically. Biohacking is at the turning point in both dimensions, while precision agriculture is both technologically advanced and socially acceptable. Negative outliers: genetically modified organisms are relatively well developed and are also used in many places. However, social acceptance is very low and the use of GMOs is controversial.

[57] Online: www.hackersbrew.com

Thousands of years of tradition: modification of foods

Humanity has been genetically modifying its foodstuffs since the beginning of settlements and agriculture. Every year, the seeds of the specimens that were particularly large, palatable or resistant were sown again. Through this continuous selection, humanity has completely modified the genes of fruits, vegetables and cereal grains in a slow process over several thousand years and created a myriad of new varieties. For example the peach: in its wild form over 6,000 years ago, it was 75% smaller than today's peach, tasted rather earthy, had a waxy skin and was found only in China. Today, peaches come in about 200 different varieties, are large, sweet and juicy, have a soft skin and grow on every continent.[58]

Much the same happened with all other agricultural products, such as maize, bananas and cucumbers. There are only two differences between this millennium-old process and GMOs: first, we no longer have to wait a thousand years for a new species to emerge, and second, manipulation today is targeted and the modification is not dependent on spontaneous mutations.

Scepticism about genetically modified organisms

One of the most well-known GMOs is golden rice. It was developed by the biologists Ingo Potrykus (ETH Zurich) and Peter Beyer (Albert Ludwigs University of Freiburg). The rice variety contains increased amounts of beta-carotene, also known as provitamin A. In South-East Asia, white rice is one of the primary sources of nutrition. But it lacks important nutrients – such as this beta-carotene, from which the body can produce vitamin A. Vitamin A deficiency can lead to blindness and increased mortality. The golden rice could prevent this.

But for political or ethical reasons, the introduction of the new rice variety was opposed in various quarters. In summer 2012, Greenpeace uncovered a scandal, which alleged that the golden rice had been tested on children in China without their or their parents' knowledge. They were only informed that the rice contains beta-carotene, and not that the rice had been genetically modified.[59]

Where does the scepticism in the population come from? Perhaps because the words gen-et-ically manipulated organisms sound like terms from science fiction. And furthermore, unlike the cross-breeding and mutations we are familiar with from traditional agriculture, GMOs combine genetic material from unrelated species of organism. This creates transgenic organisms. It could be possible for these transgenes to be passed on to other organisms, infiltrating non-GMOs or creating new super-resistant pests.[60] The report "Genetically Engineered Crops: Experiences and Prospects", published by the National Academy of Sciences in May 2016, states that GMOs are safe, or in any case there is no evi-

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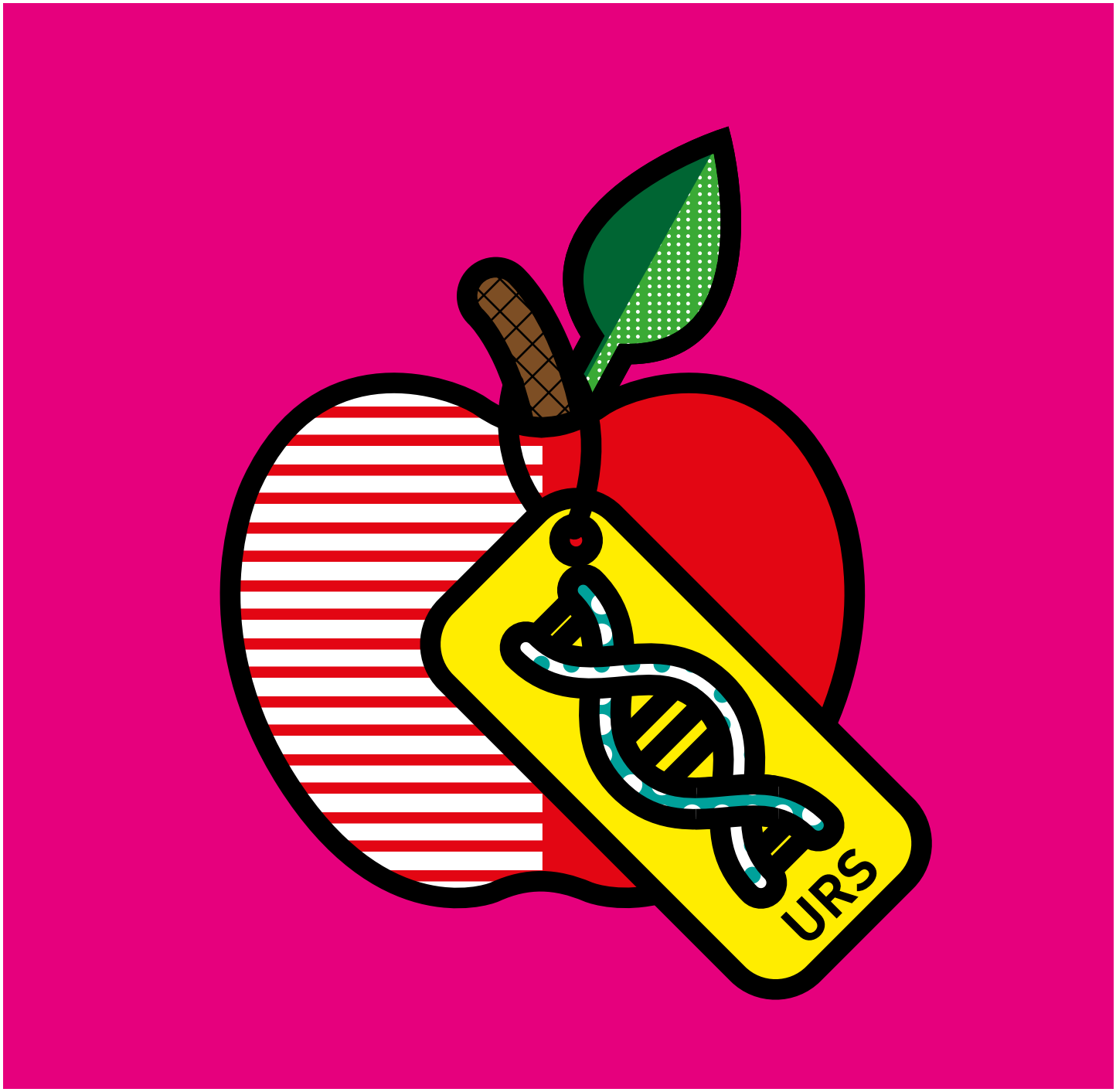
58 James Kennedy (09.07.2014). «Artificial vs Natural Peach». Online: jameskennedymonash.wordpress.com/2014/07/09/artificial-vs-natural-peach

59 Nature (10.12.2010). «China sacks officials over Golden Rice controversy». Online: www.nature.com/news/china-sacks-officials-over-golden-rice-controversy-1.11998

60 National Geographic, The Plate (29.04.2014). «Rebecca Rupp: I'm Pro-GMO and Here's Why». Online: theplate.nationalgeographic.com/2014/04/29/rebecca-rupp-im-pro-gmo-and-heres-why



dence of harm. However, the report also acknowledges that the potential yields of the grains were not increased (although crop losses were reduced by pests) and that there were problems with herbicide-resistant weeds.[61]

With GMOs against world hunger

Despite the various controversies, many scientists – particularly in the GMO-friendly United Sates – believe that genetically modified organisms are useful. They could help to feed the world and replace fossil fuels. Soya for example can be better adapted by genetic engineering to future environmental conditions – higher temperatures and higher levels of CO2 in the air – to produce higher yields than conventional crops. Sugarcane can be genetically modified to produce oil in its leaves and stems, from which biodiesel can be produced. Modified plants also produce more sugar, which can be used to produce ethanol. These crops can also be grown on marginal lands in soil that is not well suited to

[61] National Geographic, The Plate (17.05.2016). «Scientists Say GMO Foods Are Safe, Public Skepticism Remains». Online: theplate.nationalgeographic.com/2016/05/17/scientists-say-gmo-foods-are-safe-public-skepticism-remains

food production, so that in just a few years' time, we may see fields of oil pumps replaced by fields of green plants.[62]

In China, a country marked by continuous population growth, people are desperately looking for options to avert a food crisis in the future. The hope is to satisfy the hunger of the growing population with higher-yield GM crops. But GMOs have a bad reputation in China. There is no scientific institution in a position to respond to the questions and criticism of the people. The widespread illegal cultivation of GMO crops and the general mistrust of government authorities after a series of food scandals (such as the big milk scandal of 2008[63]) have also all contributed to the scepticism regarding GMOs.

Nevertheless, China has big plans: the merger between the two state-owned companies Si-nochem and Chem-China, which took over Swiss agrobusiness Syngenta in mid-2017, will create the world's largest chemical company.[64] China is therefore on the offensive in an effort to increase acceptance of GMOs. In a nationwide survey, the government is trying to find out what the public's concerns are with respect to GMOs. At the same time, it has launched a social media campaign to broadcast basic knowledge of GMO technologies. Before large-scale production of GMOs starts, the Chinese government is therefore pushing to get its people on board with the acceptance of these foods.[65]

The Data Aggregator wins

Organic, regional and fresh: for years now, these selling points have been gaining in im-portance. The need for naturalness and authenticity continues to grow – especially in an eve-ryday life characterised by mobility and flexibility. In response, digitisation is offering more and more new solutions: many of the new services help us to use technology to find fresh and local organic products. Just take a look at Silicon Valley and you'll see: digitisation has reached the food industry.

One example is food delivery. This includes companies that organise the delivery of food to the customer's home: restaurant deliveries, food delivery services such as Instacart, farm-to-table services, meal delivery services like eat.ch or Delivery Hero, and recipe box delivery services such as Hello Fresh.[66] The most common form of food delivery is still the traditional restaurant delivery: the hungry customer contacts the restaurant directly – usually by phone – and the restaurant brings the food to the customer's doorstep.

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62 Eco-Business (30.05.2017). «GMO crops could expect a brighter future». Online: www.eco-business.com/news/gmo-crops-could-expect-a-brighter-future

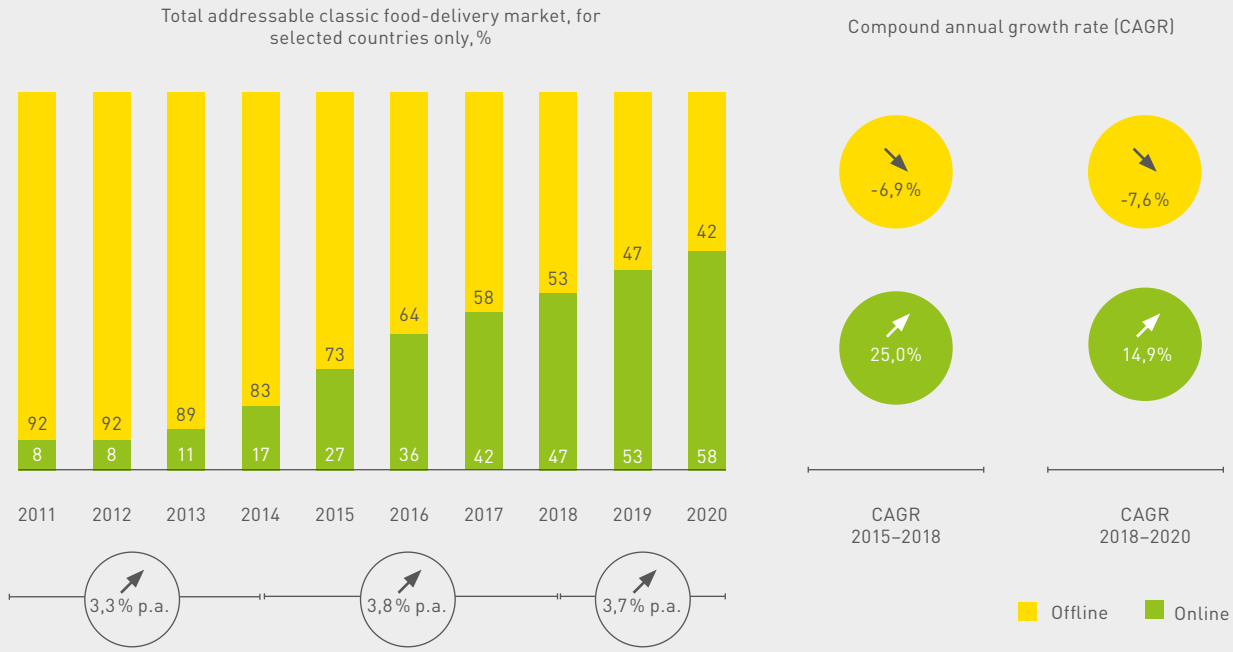
63 In the Chinese milk or melamine scandal, it was revealed in 2008 that melamine – a nitrogenous synthetic resin base - had been added to the milk products. This was in an attempt to give the appearance of higher protein content in the diluted milk. In 2008, the adulterated milk was also used in baby foods, leading to kidney stones and renal failure. Nearly 300,000 babies were taken ill, and six died.

64 Süddeutsche Zeitung (10.05.2017). « China plant grössten Chemiekonzern der Welt». Online: www.sueddeutsche.de/wirtschaft/fusion-china-plant-den-groessten-chemiekonzern-der-welt-1.3497681

65 Bloomberg (22.05.2017). «China Pushes Public to Accept GMO as Syngenta Takeover Nears». Online: www.bloomberg.com/news/articles/2017-05-22/china-pushes-public-to-accept-gmo-as-syngenta-takeover-nears

66 CB Insights (15.05.2017). «An Uncertain Future: New Entrants In The Food Delivery Space Decline As Existing Startups Struggle». Online: www.cbinsights.com/blog/food-delivery-startups-crowded-market

Shift from Offline to Online Channel in the Food Delivery Market



Source: McKinsey & Company, 2016

But digital technologies are changing the landscape of the food delivery market. Customer are now used to shopping online on apps or websites. Why should they have to forego the same convenience and transparency when ordering food? This is where online food delivery start-ups come in. Often they come from the tech industry. In contrast to traditional delivery services, it is not only the ordering process that changes, it is also the range: more fresh and healthy menus, more organic and veggie instead of just pizza and sweet & sour.

Aggregators and new delivery services

You can make a distinction between two types of online food delivery: on the one hand, there are the aggregators or portal services like Delivery Hero, foodpanda and Grubhub. These companies provide a portal on which everything on offer from the participating restaurants is listed. The customer can easily compare menus and prices. The restaurants take care of delivery, and the aggregator receives a fixed percentage of sales.

On the other hand, there are the new delivery services like Deliveroo or Postmates. Their approach is similar to that of the aggregators: the customer accesses a platform to view and compare everything on offer at a glance. The key difference: the new delivery services take care of the logistics and food distribution themselves. This allows restaurants that do not have their own delivery service to participate. The new delivery services also make their money with a fixed percentage of the restaurants' sales revenues. In addition, the customer also pays a small fixed amount.[67]

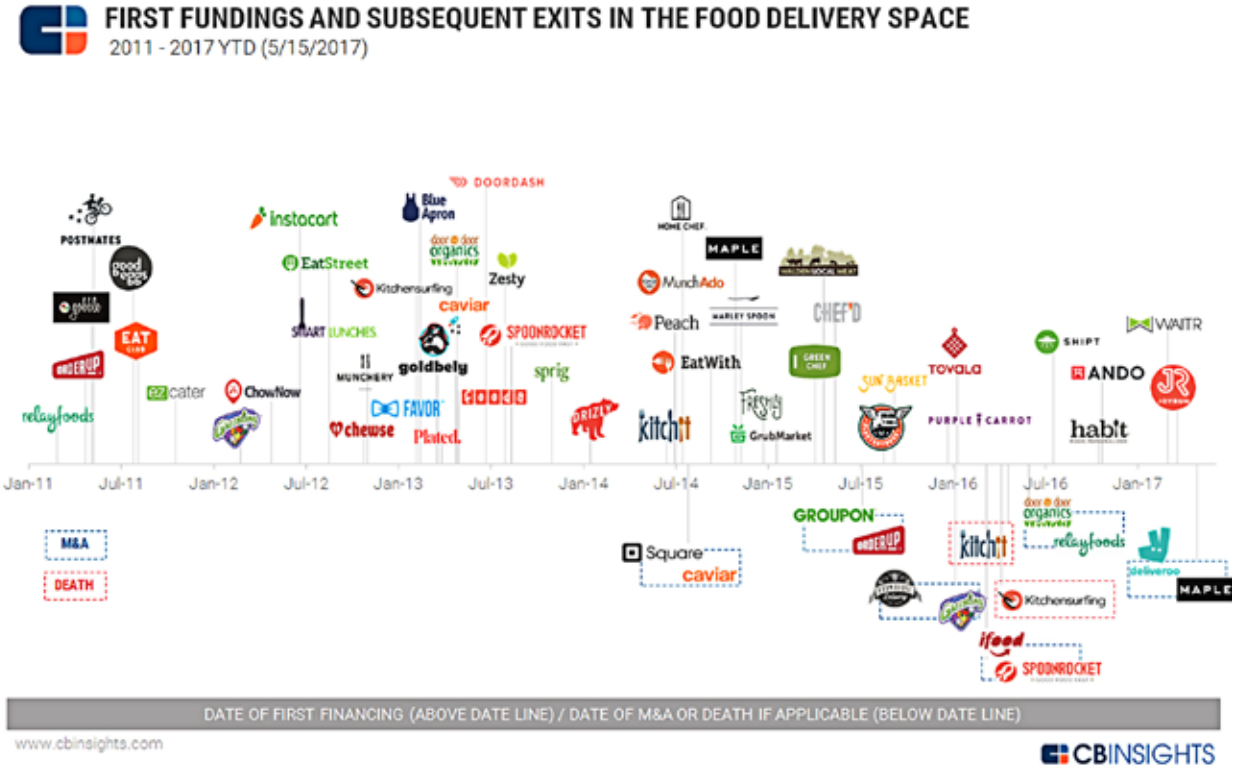
[67] McKinsey&Company (November 2016). «The changing market for food delivery». Online: www.mckinsey.com/industries/high-tech/our-insights/the-changing-market-for-food-delivery

From offline to online service

The food delivery market is currently in the process of shifting from the offline to the online channel. McKinsey&Company expects an online delivery growth rate of 25% in the years 2015 to 2018 and growth of almost 15% by 2020. In 2016, the online share of the entire delivery market cracked the 30% mark for the first time (see graphic). In the future, the online share will reach a market share of up to 65%. The same pattern has previously been observed in the more advanced market for air travel, where a dramatic shift from the offline to the online channel has taken place in the last 10 to 15 years.

In Europe, much of this development in the food delivery sector has already taken place, while Asia, South America and the Middle East are still at the beginning. The main drivers of the switch from the offline to the online channel are not only mobile phones and digital technology, but also the overall level of investment in the sector and the size of the companies' marketing budgets.[68]

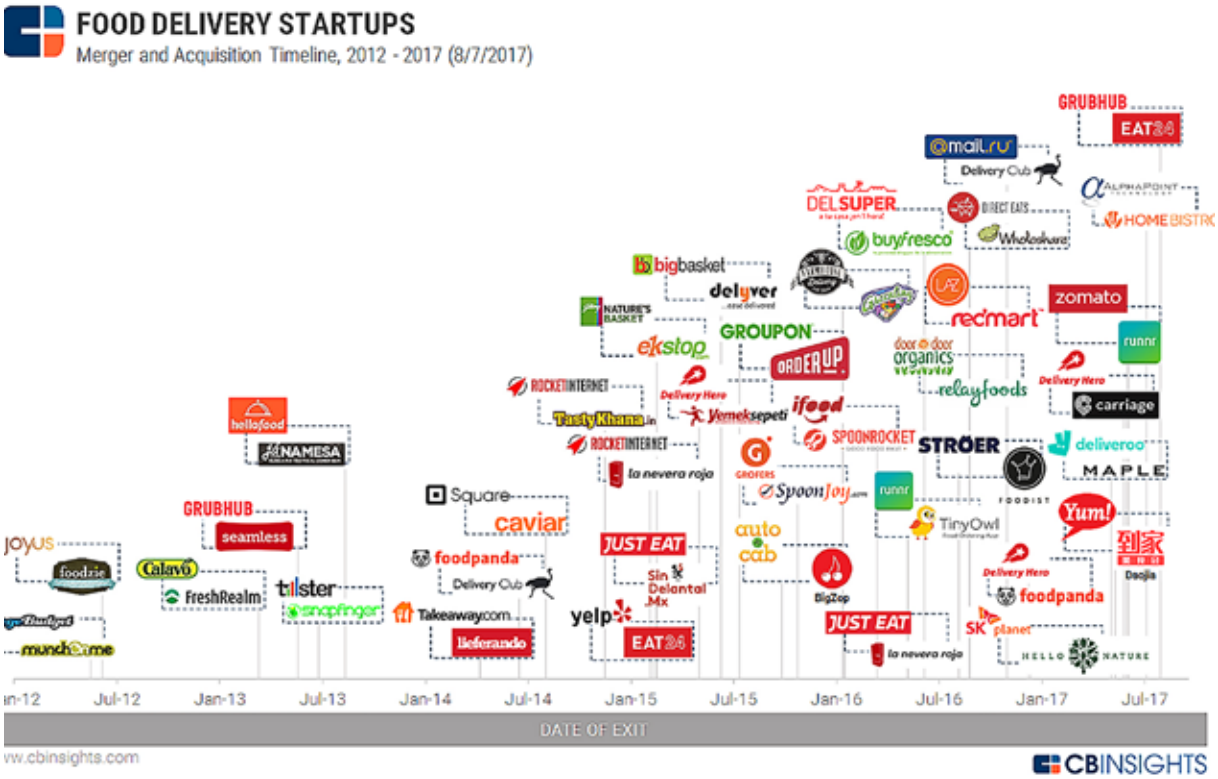
[68] McKinsey&Company (November 2016). «The changing market for food delivery». Online: www.mckinsey.com/industries/high-tech/our-insights/the-changing-market-for-food-delivery



The food delivery market is changing constantly. At the beginning of the 2010s, investment in food delivery start-ups looked like a promising strategy for venture capitalists. Because many large food delivery players quickly reached high valuations, more start-ups felt encouraged to enter the emerging new market. As competition intensified, these start-ups had to look for profitable business models. As a result, the initial euphoria surrounding the financing of start-ups has cooled somewhat in the past two years.

The graphic from CBInsights on page 52 shows this trend clearly: delivery start-ups like Postmates, Blue Apron and Doordash received high valuations in the early 2010s. The encouraged imitators. Since then, fewer new start-ups have entered the new market. In 2016 and 2017, there were only seven new entrants, while in 2014 there were eight, and in 2013 as many as twelve.[69] Since 2014, companies have even disappeared from the market – through mergers and acquisitions by

[69] CB Insights (15.05.2017). «An Uncertain Future: New Entrants In The Food Delivery Space Decline As Existing Startups Struggle». Online: www.cbinsights.com/blog/food-delivery-startups-crowded-market



major competitors, as was the case with Maple or SpoonRocket, while others like Kitchit or Kitchensurfing failed to survive.

Acquisitions and mergers

In the area of mergers and acquisitions (M&As), the market has been moving in the past two years: the number of acquisitions and mergers has grown rapidly over the past three years, as can be seen in the infographic from CBInsights on page 53. In 2016 alone, there were more M&As than in the years 2012 to 2014 together. As funding declines, smaller players are forced to think about strategies for survival in the market. The best solution is often a takeover by a larger competitor or a merger.

Even before 2016, there were some major M&As, such as Square's acquisition of Caviar in Q3'14 and GrubHub's merger with Seamleass in Q2'13. However, the two biggest acquisitions in the food delivery sector took place in the fourth quarter of 2016, with Germany-based Delivery Hero's acquisition of global mobile food delivery platform foodpanda (310 million US dollars in total funding) and Philippine online shopping platform Lazada's acquisition of Singapore-based grocery delivery platform RedMart (58 million US dollars in total funding).

Lazada and RedMart are indicative of another trend in the food delivery market: acquirers are no longer necessarily coming from the food delivery sector itself, but also from other industries such as e-commerce, mobile payments or communication technology. For example, Russia-based email service Mail.ru acquired Russia-based Delivery Club in Q4'16.[70]

This trend can also be seen in China, where online giant Alibaba is looking to secure a share of the massive Chinese food delivery market. Alibaba invested more than a billion dollars in the food delivery service Ele.me. Ele.me, which translates as "Are you hungry now?" Is extremely popular in China. Alibaba's competitor Tencent Holdings already holds shares in Meituan-Dianping – the world's largest online and on-demand delivery platform – and with its investment in Ele.me, Alibaba is presumably trying secure important market shares. In addition, this will also enable the Internet giant to grow awareness of its online payment services and develop customer loyalty.[71] [72]

Data sovereignty decides

Who will emerge as the winner of this investment battle? Which companies can survive? One decisive factor will be data sovereignty. Whoever has the most data about their market, their customers and their competitors will emerge as the winner. Big data companies like Google, Amazon or Alibaba have long since understood that you can only be successful if you understand your customers and their needs – ideally before they are even aware of their needs themselves. As a company, you should try to integrate your customers into your own ecosystem, which they will not have to leave, be able to leave or want to leave.

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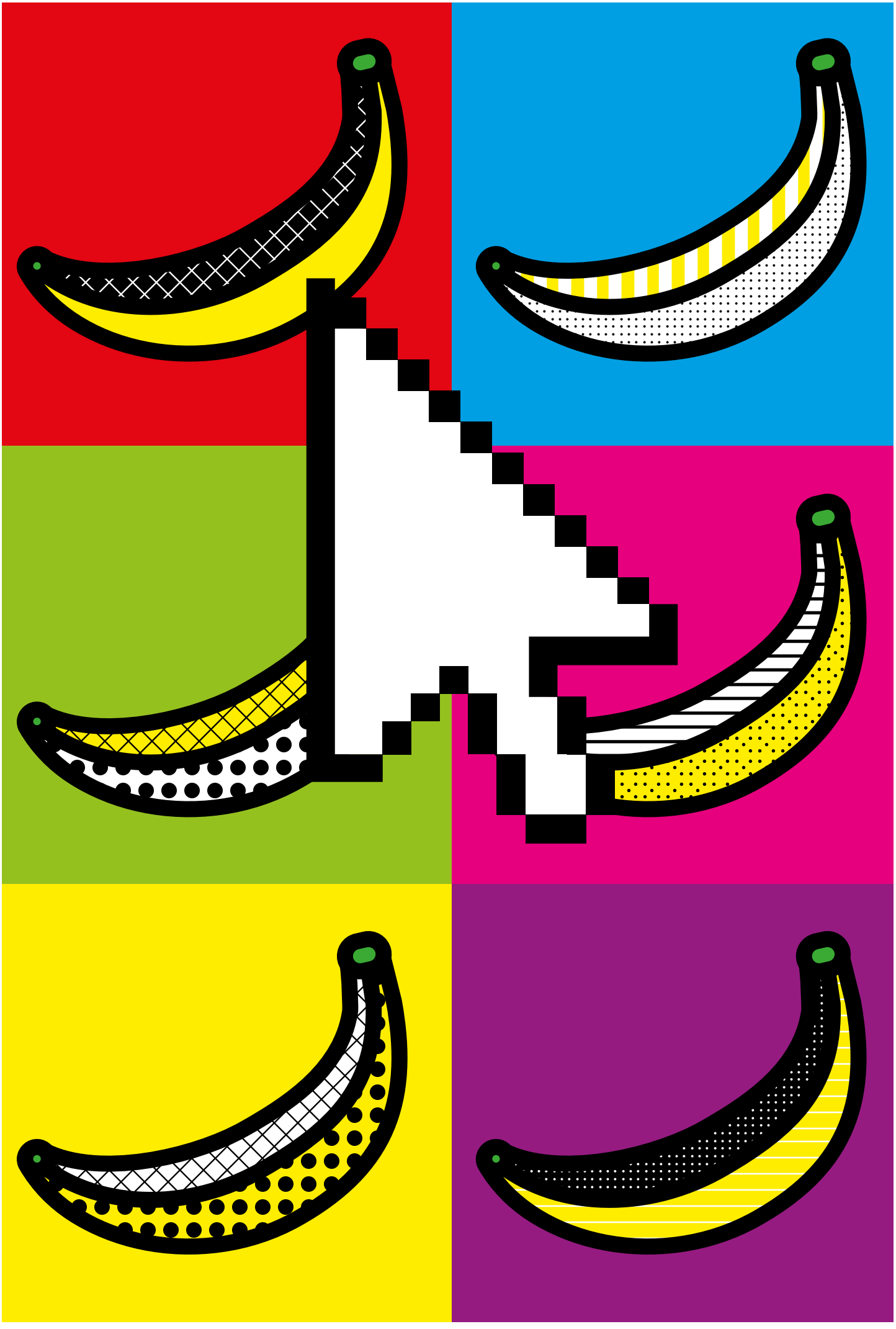
[70] CB Insights (17.03.2017). «Eaten Up: The Consolidation Of The Food Delivery Space In One Timeline». Online: www.cbinsights.com/blog/food-delivery-merger-acquisition-timeline

[71] RT News (25.05.2017). «Alibaba to lead $1bn funding for food delivery startup». Online: www.rt.com/business/389672-alibaba-funding-food-startup

[72] Handelsblatt (14.04.2016). «Alibaba steckt über eine Milliarde Dollar in Essens-Lieferdienst». Online: www.handelsblatt.com/unternehmen/it-medien/ele-me-alibaba-steckt-ueber-eine-milliarde-dollar-in-essens-lieferdienst/13450748.html

The food delivery industry is on its way to developing ecosystems of this kind. A consolidation is taking place, companies are acquiring each other, and generally also their customers too. And the external tech giants like Google, Amazon and Alibaba are also coming to the party to join in the fun. Professor Christopher Muller of the Boston University School of Hospitality Administration summarises this trend as follows: "A pluralism of demand and a consolidation of supply: more choices but fewer places to get it from." So will we at some point in the future no longer be getting our food from the nice Italian around the corner, and instead from an Internet giant from China or Silicon Valley? We will see...



Key takeaways

VALUE NETWORK RATHER THAN VALUE CHAIN

Individualisation, digitisation, automation and globalisation are not only changing the needs of consumers, the entire value chain is undergoing a radical change. The linear path from raw material to customer via production, processing, distribution, retail market, food service industry, consumption and – ideally – recycling is no longer the only possibility, and exists instead alongside a wide variety of interfaces and channels. All components of the value chain are linked to each other. New delivery services and drones are bypassing big middlemen to deliver directly from the farm to end customers or restaurants. Consumers are emancipating themselves and again growing their own vegetables or printing their food conveniently with a 3D printer. Production is immediately followed by consumption. The value chain is becoming a value network, and the entire world of food is in a state of turmoil.

With various disruptions having broken the value chain, a reorganisation into a value network is now taking place. As part of this process, the focus is increasingly shifting to end customers, whose new needs are changing the architecture of this network. Niches are emerging for new and promising business models, as the success of Uber, Airbnb or Deliveroo has shown.

Thanks to digital communication technologies and social media, consumers are fully inter-connected. This leads to a shift in power relations. It is becoming easier and easier for customers to have their say about what is on offer. The consequence: producers and suppliers have to adapt even more rapidly to global customer requirements that are constantly changing. Without new forms of organisation, process automation and the networking of all elements in the value network, this would be virtually impossible to achieve.

FOOD IS BECOMING POP

Food permeates all areas of our lives. There is also a process of atomisation and recombi-nation taking place in our minds. We continue to assign new functions to food. Status as opposed to metabolism, sm(art) as opposed to artificial – the role of food is subject to constant change. From food procurement to its function as a source of energy for physical work to the expression of a lifestyle food porn. Food today goes far beyond food intake. It is finding its way into every area of our lives and manifests itself in many ways. Food is increasingly be-coming a lifestyle choice and badge of identity – "Tell me what you eat, and I will tell you what you are."

Food is social, and therefore a lively topic of debate on the net, whether in blogs, Instagram posts or cooking shows and recipe videos on YouTube. Food and technology are closely intertwined. Food is becoming high-tech. A great deal of money is being invested in new de-livery services, high-tech packaging, machine support in production or alternative sources of protein.

But the most important facet of food is health. Today, we are almost obsessed with food. We are aware of the impact of diet on our health and general wellbeing. Digestive wellness is the magic word: if my digestion works well, the rest of my body will be well too – or so we think. However, the exact relationship between digestion and health is not yet fully understood and the subject of current research. The fact is: the stomach and gut are recognised as key organs. In terms of importance, they are hot on the heels of the brain.

Today and tomorrow: from the value chain to the value network

	today	tomorrow
Production	– Science is viewed critically (GMOs, industrial processing) – Globalised agriculture – Huge agribusinesses – Large-scale, sometimes automated production	– Science becomes normal (GMOs, in-vitro meat, 3D printers) – Production increasingly regional/urban – Non-industry producers (Google, Philips etc.) – Precision agriculture
Processing	– Industrial processing – Many artificial additives – Large machine parks with shift work	– Reduction to elimination of artificial additives – Fully automated factories with AI
Distribution	– Controlled by humans: truck, train, ship, plane – Consumer pull: delivery on demand – Multiple middlemen	– Autonomous: drones, self-driving cars, delivery robots – Supplier push: delivery triggered automatically – Middlemen bypassed
Retail and service	– Primary retail: consumer comes to retailer – Supermarkets – Guest goes to restaurant	– Platformisation: retailer comes to consumer – Online retailers – Delivery services: restaurant comes to guest – Restaurant = experience
Consumption	– Fast good instead of fast food – Food trucks and street food festivals – Fresh, local, vegan	– Food substitutes (Soylent & Co.) – Nootropics & smart drugs – Everything becomes food
Recycling	– Growing awareness of food waste – Some sorting of waste – Mountains of plastic in the ocean	– Only reusable materials – Unpackaged – Edible packaging

Source: GDI, 2017

DATA IS KING

Google, Amazon and Alibaba are leading the way. A company that wants to succeed in our highly digitised world must understand its market, its competitors and its customers exactly. Well-structured data and information management is therefore essential. Data will become the most important currency in the future and will decide on success or failure.

M. Asim Soysal, Strategic IT Consulting at Fujitsu Technology Solutions, speaks of the four Vs of data management: Volume: To process large amounts of data, the appropriate processes, systems and infrastructures must be available. Velocity: Data must be processed quickly to ensure that it is available at the right time, at the right place and to the right person. Variety: The king's discipline – where does the data come from, what kind of data is it, who owns it, how can I work with it? Veracity: The data must be correct and true if you want to make the right decisions based on it.[73] He summarises the importance of data as follows: "Those who do not know how to deal with the four Vs of data management will lose the race against the competitors, the cyber criminals and the supervisory authorities."[74]

However, good internal data and information management by itself is not enough. It is be-coming increasingly important for companies to position themselves centrally in the value network and to be linked to as many players as possible. If you control the network, you control the information and data flows. It is true today, and it will be true tomorrow: "Data is king" – and the ruler of the information flows will ultimately be the victor.

[73] Online: blog.global.fujitsu.com/index.php/data-is-king-mastering-the-data

[74] Cashkurs (30.05.2016). «Data is King». Online: www.cashkurs.com/hintergrundinfos/beitrag/beitrag/data-is-king

Method and procedure

DESK RESEARCH

From research into the specialist literature and screening of new business ideas and start-ups, an initial overview of the status quo and the trends in the food world emerged. On the basis of trend studies, we also identified the social drivers that will shape the consumption needs of tomorrow.
After compiling the most important trends and drivers, they were assigned to the different stages of the value chain in order to generate an overview "from farm to fork".

ONLINE SURVEY

In an online survey, international experts from all stages of the value chain were asked about the most important trends in the industry. For each stage of the value chain, the experts were given a list of current trends from their respective areas. The survey participants were then asked to complete the list with the most important trends from their perspective.

INTERNAL WORKSHOPS

In an initial internal GDI workshop with participants from the think tank and communication department, the results of the online survey were debated and discussed. The next step was to generate theses and scenarios for the future of the food industry from the findings of the survey.

In a second internal GDI workshop with participants from the think tank, the innovations and concepts for the Food Disruption Map were discussed and assigned their positions on the map.

COOLHUNTING: NETWORK ANALYSIS

To find out which people in the food industry are most prominent on the Internet, a network analysis was carried out. At the outset, GDI drew up a list of important people from the world of food, including star chefs, TV chefs, professors of nutrition sciences, restaurateurs and food bloggers. Using Galaxyadvisors' Condor software, we looked on both the web and Wikipedia to find the people occupying the central positions on the network, who are therefore most prominent. For the top 5 in each case, we conducted another network analysis to see how these people are linked to each other.

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