

## The Future of Food: New Tech to Save the World



By Rachel Eva Lim , INSEAD Knowledge

### Could innovative, tech-driven solutions be key to fixing our broken food systems?

From lab-manufactured, plant-based meat alternatives to AI farming solutions, the past few years have seen a raft of inventions designed to address the plethora of agricultural and food challenges facing us today. Food insecurity remains a pressing global crisis, while decades of irresponsible practices have had a damaging effect on the environment.

Could tech hold the key to ushering in a new, more sustainable era in the food industry? In a recent [Tech Talk X webinar](#), INSEAD Professor [Chengyi Lin](#) spoke with three INSEAD alumni - Carrie Chen, co-founder and CEO of Avant; Jagannathan Doraiswamy, co-founder and CEO of TechCamellia; and Tim Van Vliet, co-founder and CEO of INSEACT - to discuss how tech can help us [rethink and reimagine](#) the future of food.

Lin emphasised the detrimental impact that increased agricultural production and unsustainable manufacturing processes have had on the environment. The razing of large tracts of forest has led to deforestation and the depletion of natural resources, which affects the water cycle and exacerbates global warming. Other activities such as overfishing and the selective breeding of crops fuel biodiversity loss, leading to species that are vulnerable to new diseases. Food production and runaway food waste also play a role in polluting the planet.

This could be because humans have generally viewed the planet as a regenerative entity with its own natural buffering system, said Lin, and believe that nature has the innate capacity to resolve and rebalance itself over time. “Any buffering or regenerative system has a buffering zone,” Lin added. “We have been pushing the planet out of that buffering zone, so the system has a hard time regenerating itself.”

### **Making tech-led sustainable solutions accessible**

To address these issues, enterprising start-ups have debuted various tech-driven products that aim to make the food industry more efficient, effective, equitable and environmentally friendly.

For instance, **TechCamellia** leverages satellites, ground-based sensors and cloud systems to offer farmers up-to-date, real-time information about their soil health and irrigation status. This helps them achieve greater efficiency and reduce their use of chemicals. “Part of our systems use machine-learning code to improve these insights,” Doraiswamy said. “Through this process, we’re creating cleaner food cycles and ecosystems in our communities.”

Lin noted that one of the biggest assumptions people have about AI and IoT is that they require a significant upfront investment and high-level expertise. This is only partially true. Companies can **leverage existing public data sets** and open-source AI algorithms to lower the costs and jump-start the process.

TechCamellia did exactly that. They harnessed publicly available weather data and supplemented this with ground-based sensor data, which requires upfront investment. The result is a unique data set for the local agricultural context that can be tailored to various clients, be they subsistence farmers

or bigger businesses. “We deliver this to farmers in a simple way, without much technical jargon,” Doraiswamy said, adding that the company prioritises obtaining a deep understanding of the farmers’ growing cycles and business models, so it can provide them with the appropriate tools.

Cost reduction has also been a big priority for **Avant**, a company that uses cell-cultivation techniques to make cell-based fish products. These include prototypes for fish fillet and fish maw, as well as marine peptides. “We no longer need to rely on killing, catching and slaughtering fish,” Chen said. While the technology can be used for different meat products, Avant chose to work with fish to cater to the Asian market and because it allowed them to have a big environmental impact.

Manufacturing proteins in a lab is extremely expensive, but Avant has figured out how to replace the costly foetal bovine serum – normally obtained from cattle – that’s vital to the cell-culturing process. “It’s too expensive and it’s not sustainable, since we’re trying to remove animals from the [production] equation,” Chen said.

### **Getting customers and clients to buy in**

Ensuring that solutions are useful and competitively priced will be key to getting customers on board. Lin noted that when it comes to plant-based or cell-cultured meat alternatives, companies have to influence consumers’ diet preferences and purchasing behaviour while contending with rising inflation. The latter may push consumers to stick with cheaper, less environmentally friendly protein options.

“Other than price and taste, Asian consumers tend to be [concerned about] food safety,” Chen said. “When we do our product messaging, we have this added layer on top of our sustainability narrative.” She encouraged those who still want to eat animal-based products to be more discerning about their consumption habits. “As consumers, we should probably ask ourselves each time we make our purchasing decisions: Did I order too much? Am I wasting it? Am I making the most sustainable choice?”

Another example is **INSEACT**, a company that creates insect protein, insect oil and insect fertiliser using insects that are fed with palm oil waste that would otherwise be sent to landfill. “This is one of the biggest sources of greenhouse gas emissions in Southeast Asia,” Van Vliet said. “We’re taking this horrible, smelly waste product in and we’re getting these beautiful

products out. They are also carbon negative, which we're really excited about." INSEACT's insect protein functions as aquaculture feed, while their insect oil and insect fertiliser are used as animal feed and for agricultural purposes respectively.

Van Vliet added that palm oil producers like to partner with INSEACT as they help them get rid of a waste product. "In the Asian context, we're seeing that people like adopting new tech as long as there is a benefit to them," he said. "Sustainability is not a benefit to most companies we're working with. As long as the price is right and the performance is right, that's when they want to adopt it."

### **The role of incumbents and other players**

While start-ups are doing innovative work, they are also smaller players in a crowded marketplace, and larger incumbents may not have the same mindset to start with sustainability as a strategic priority. How, then, can these start-ups work with existing organisations to move the field forward collectively – and is that even possible?

Chen and Van Vliet emphasised working with larger firms in a way that suits organisational interest. "For us to scale, we definitely need to partner with larger companies, we can't do this alone," Van Vliet said. "The question is always how to do this in a way that ensures you're not crushed by the larger company."

Chen added that strategically teaming up with bigger corporations has allowed Avant to accelerate their speed to market. Doraiswamy highlighted the importance of receiving funding from venture capital firms, while Van Vliet stressed the role that governments play in creating regulations for such companies to feel supported and thrive.

"I think the food space is maybe the most important space in the world," Van Vliet said when asked by Lin to sum up his thoughts on the industry's future. "Inflation and the increase in food prices is a huge problem, and it'll just get worse, so it's time to really focus on alternative proteins and different ways to design our food systems."

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