

We are what we eat, but what if our food changes dramatically in the Future?

According to the Food and Agriculture Organization of the United Nation (FAO) 9.2 billion people will need to be feed by 2050. The food sector has been relatively slow at capitalizing on recent technological advances but there is a possibility of a genuine disruption in the near future where Food Intelligence can play an important role in this trend.

With the explosion of data coming from advanced technology tools, the use of artificial intelligence is essential to analyze and help farmers and policy makers to make the right decisions and produce Alternative Food throughout innovation.

The Future of Food lays out few potential pathways to meet the needs of the world's growing population in a sustainable and healthy way: alternative food but also changes to current production systems; and consumer behavior. The treatment of these offers an interesting potential, but regulation is a must.

What difference would it make to the global food system, and its effects on the environment, health and other areas, if the world made a transition from traditional food to food substitutes, especially given that the global food system is complex with many feedbacks and non-linear effects?

We are going to explore 5 key points related to Food Intelligence as a new factor to alternative food.

1/ The green Data: the true seed for alternative food

Because the new seed to alternative food is undoubtedly: Data...

The last digital shift in the agro-food industry is predictive analytics.

Major groups are already trying to have a proactive action in the markets with artificial intelligence methods, widely used for some big data analytics, we are able to follow the evolution of the consumer tastes in the food market.

Quantitative modelling determines what needs to be known to make better decisions. Constructing a model forces the quantification of a system and, as a result, reveals knowledge gaps. For example, the research found that there were some products, such as the most sophisticated plant-based burgers, that could not be included because sufficient relevant information was not available.

Modelling also allows a better understanding to emerge as to what factors are the most important in determining outcomes. This helps to show not only where future developments may have the greatest impact but also what parts of the food alternatives will need to be understood in most detail to make good decisions.

Employing quantitative models with analysis that shows a wide range of food alternatives can have important benefits and it also notes gaps in knowledge, where further exploration will be required. This is the example of the 3,000 Rice Genomes Project calls for the global rice community and the global market for the future with the release of a sequencing data worldwide. It is the result of a collective efforts by an international scientific community, a public database containing genetic and genomic information suitable for advancing food technology and predict potential food alternatives.

2/Artificial Intelligence can change the structure of food in our plate

According to McKinsey Institute, the AI market for agriculture was close to \$ 518.7 million in 2017; it is expected to grow by more than 22.5% a year on average to reach \$ 2.5 billion by 2025. It is not surprising to see that Microsoft wants to develop artificial intelligence in agriculture, because Food-Tech in the agricultural field, unfolds in several ways.

The subject is topical through many advanced technologies that feed all fantasies, but in the field of food, what role can artificial intelligence play in our daily lives and change the way we eat? The first element of answer is the possibility of artificial intelligence, with the associated use of big data, to propose personalization of food product according to its consumer. Decomposition of taste, associations of flavors, personalized recommendations.

Researchers and companies use AI technologies to reinvent our diet with Artificial Intelligence that makes it possible to find alternative ingredients, or to create new ingredients by mixing other food options.

AI offers the opportunity to use different types of data, for example, the personalization of food proposals based on the tastes and habits of its users, but also the context.

But what are the consequences? Is to lock users in their habits, like the famous Facebook "bubble", object of controversy last year which could be problematic in the case of food as well: a person who likes to eat fat or sugar might risk of being recommended food from the same preference only.

3/ Building the 4.0 Food Supply

The digital revolution creates new market opportunities, but also leads to the emergence of new economic actors that can "disrupt" the structure of the food chain from agricultural production to consumption, processing and finally the distribution. Everyone is working to draw the agriculture and food of tomorrow that will take into account new eating habits and of course new food alternatives.

Because the food of tomorrow seems to propose animal products without animals, meat without meat, egg without chicken, mayonnaise without egg, dessert without milk. Steaks can be plant-based: beans, chickpea, corn, wheat, soy, or stem cells from cow grown in the laboratory. The water will take the taste of orange juice by "deceiving" the consumer's sense of smell by adding natural aromatic additions, and the milk can be designed in test tubes.

Another emerging trend is to evolve each product to remove the bad fats, sugars, salt or any other substance that may be bad for our health and this is when Health Meets Tech-Food...

4/ When Health Meets Tech-Food:

Is it known that Individuals choose which particular types of food to eat based on their intrinsic beliefs about what is good or bad about them. Understanding this dynamic is essential to predicting how diets will evolve and how to encourage more sustainable and healthy food choices.

Artificial Intelligence can definitely help improve the health of the global population. There are applications to track your diet. With these data, it is possible to create a system and ask a recipe that fills people's deficiencies and find alternative food for lactose intolerants or people suffering from diabetes for example.

Given a particular diet and knowledge of its nutrient composition, it is possible to use epidemiological data to estimate consequent health effects. Artificial Intelligence can be used with some model such as substitution analysis that allows an exploration of the effect of diet switching.

And finally, alternative food has an advantage of lowering the risk of food poisoning or contamination. Because livestock production is often perceived as a messy business involving the management of animal waste and dairy products. There are many opportunities along the supply chain for food to become contaminated or spoiled, especial in countries where refrigeration is expensive and power supplies unreliable. The production of plant-based food involves fewer opportunities for contamination or spoilage, while cultured alternative food production offers the promise of laboratory-level control of the whole process.

5/ Combining technological advances and environmental responsibility

Alternative food will have to be produced sustainably in ways that contribute to reducing climate change, and that address other environmental challenges.

For instance, when it comes to meat consumption, it would be impossible for a global population of almost 10 billion people to eat the amount of meat and keep the agreed sustainable development goals (SDGs) for the environment and climate.

For the simple reason that it would require too much land and water, and lead to unacceptable greenhouse-gas and other pollutant emissions.

This is the reason why the idea of switching from beef to alternative meat can lead to significant reductions in greenhouse-gas emissions, especially for transitions to plant or insect based alternatives.

Environmental Regulation agencies are being challenged to develop appropriate rules for the new wave of alternative food. Good regulation that protects the environment and can both stimulate innovation and promote value creation.

Clarity about which agencies have responsibility for regulation is critical to realizing the potential of alternative food and this is where my conclusion comes about alternatives food in United Arab Emirates particularly.

Conclusion:

It is hoped that the key points presented in this paper will provide a starting point for further discussion in UAE in accordance to the UAE Centennial 2017 Plan and it is intended to facilitate further debate and dialogue and to identify areas of opportunity and critical intervention points.

The rise of electric vehicles and the recent decline of the diesel combustion engine provide examples of the rapidity where technologies and infrastructures can be disrupted. The UAE needs to develop the promotion of “Food Futurologists” who will envisage new products outside of our current sensory experience that will create new food cultures with the growth of global food demand and Evolution of diets.

It also seeks to encourage progress, in particular by harnessing the transformational possibilities of advanced technologies and the Future throughout some key actions such as:

- Becoming a world reference in innovative and digital solutions that improve competitiveness, safety and quality food productions, while preserving the planet.
- Promote AI training and digital research related to Food Intelligence in UAE.
- Create a leading ecosystem in Food Intelligence and develop niche initiatives with the Development of locavorism, favoring future UAE alternatives products.
- Promote an accelerated Digitalization of the sector, primarily an access to Data.
- Regulate ownership of private and public data related to food intelligence.
- Contribute to the economic growth and influence of Food Security regulations in UAE and worldwide.

But most importantly, it argues for a systemic multi-stakeholder approach with the following Ministries in United Arab Emirates:

- Ministry for Food Security
- Ministry for Artificial Intelligence
- Ministry for Advanced Science
- Ministry of Climate Change and Environment
- Ministry of Health and Prevention

The UAE vision will definitely build new platforms of action to accelerate and scale the alternative food economy that will help create the future we want in a safe and sustainable manner provided for all.