Cocoa flavour quality and artificial intelligence in the industry 4.0

Abstract

The concept of food quality is intriguing, spanning various dimensions across the entire food production chain. The imperative to meet this expanded quality paradigm has forced a move away from conventional analytical methods towards more comprehensive strategies. The market dynamics for cocoa products are heavily influenced by their flavour quality, often driven by marketing and contingent upon the entire supply chain. However, the standardization of flavour quality over time proves to be challenging, given that this crop is primarily sourced from non-EU countries through numerous independent farmers, resulting in notable batch fragmentation and heterogeneity. Socio-political instability and the adverse impacts of climate change further exacerbate challenges to production and farm sustainability.

Moreover, financial incentives drive boarder-line practices, leading to detrimental consequences such as unfair competition, erosion of consumer confidence, and compromising food safety. As a future-looking strategy, Industry 4.0 uses information technology to promote industrial transformation through digitisation and computerisation of production, thus elevating the levels of process automation. In cocoa industry, Artificial Intelligence (AI) emerges as a pivotal player, notably enhancing cocoa quality and aiding decision-making processes. These AI-driven advancements contribute substantially to increase efficiency, sustainability, and competitiveness in the global cocoa market. This presentation will delve into the potential and constraints of artificial intelligence to address real industrial challenges.