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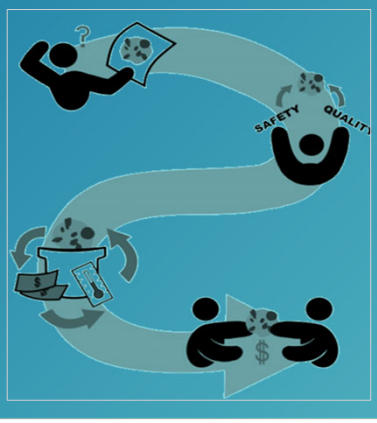
Big Data and its (Artificially) Intelligent use in dynamic food safety risk management in the food chain.



Dr. John Donaghy

Global Head of Food Safety
Nestlé S.A.

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Our foundation for trust

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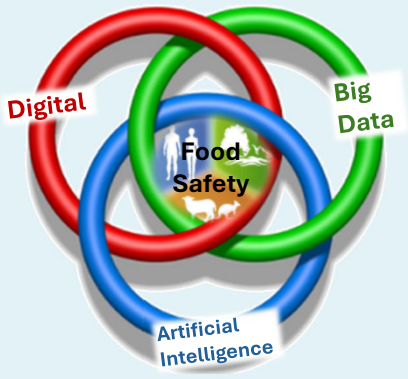
Digital Transformation, Coupled with AI, Should Bring Value



2

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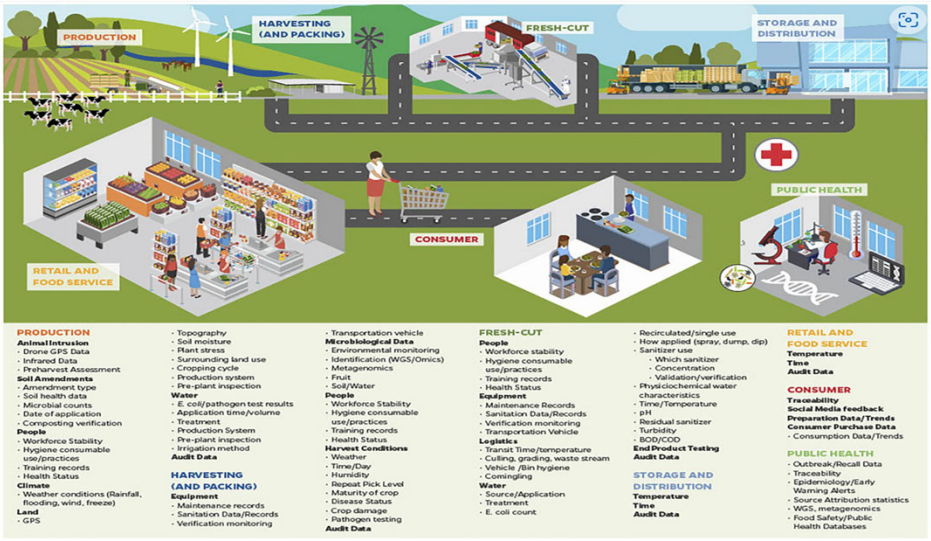
Multiple data collection points in food value chain



Donaghy JA, Danyluk MD, Ross T, Krishna B and Farber J (2021) Big Data Impacting Dynamic Food Safety Risk Management in the Food Chain. Front. Microbiol. 12:668196. doi: 10.3389/fmicb.2021.668196

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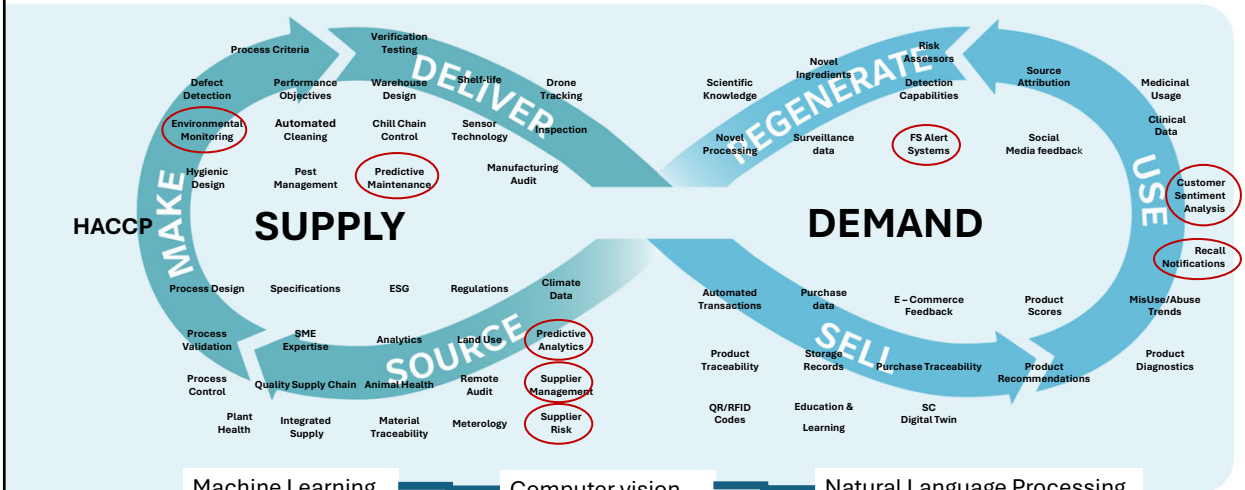
Utilizing and Joining Up The Goldmine of Food Safety Data Using AI Tools



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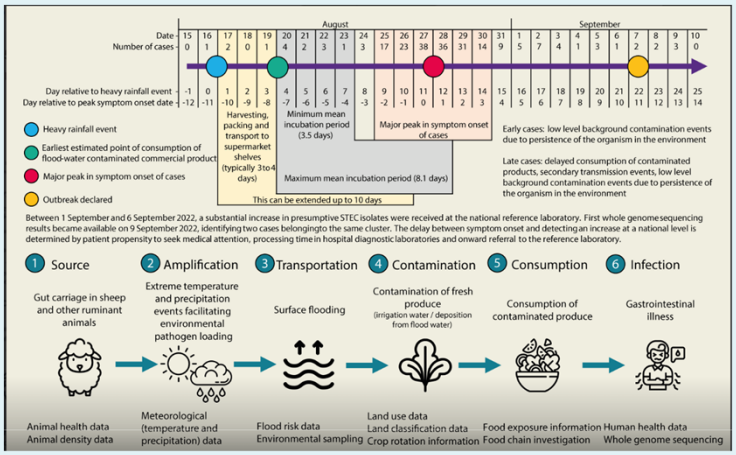
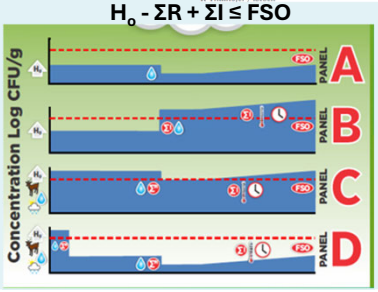
Reverse Engineering An Outbreak using Data sources



K Thalhofer / iStock

$H_o - \Sigma R + \Sigma I \leq FSO$



Cunningham Neil, Jenkins Claire, Williams Sarah, Garner Joanna, Eggen Bernd, Douglas Amy, Potter Tina, Wilson Anthony, Leonardi Giovanni, Larkin Lesley, Hopkins Susan. An outbreak of Shiga toxin-producing Escherichia coli (STEC) O157:H7 associated with contaminated lettuce and the cascading risks from climate change, the United Kingdom, August to September 2022. Euro Surveill. 2024;29(36):pii=2400161. https://doi.org/10.2807/1560-7917.ES.2024.29.36.2400161

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Digital Transformation of Data Everywhere Along The Food Supply Chain

Early Warning | Precision Agriculture | Environmental Monitoring | Genomics Data | Chat Bots/AI

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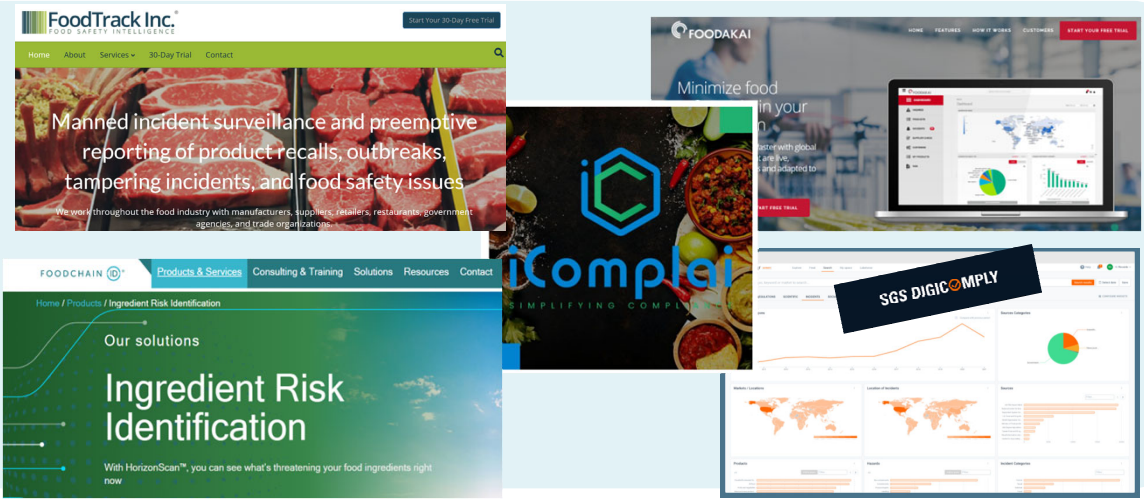
Data Mining Tools To Support Food Safety Early Warning



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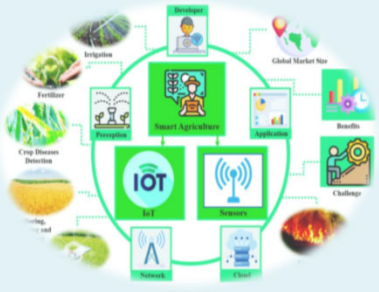
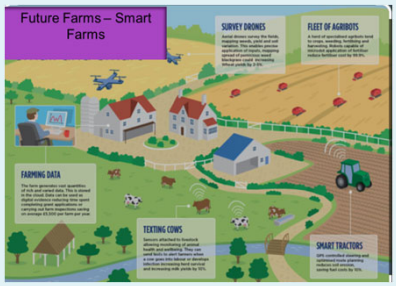
Smart Agriculture – Farm Data For Dynamic Food Safety Risk Management





https://doi.org/10.1016/j.asej.2023.102509

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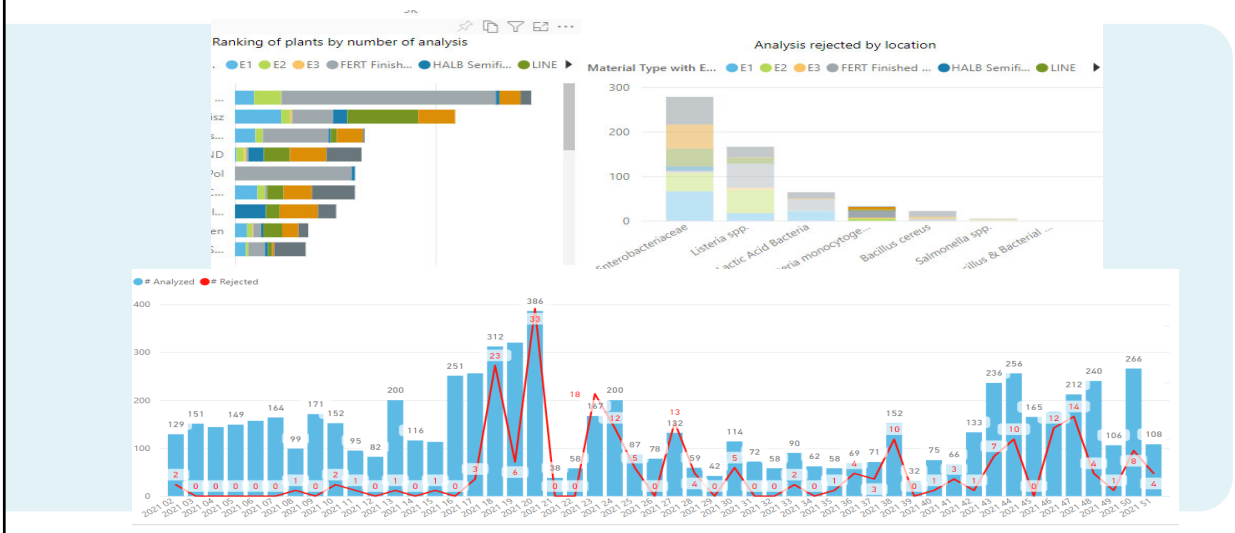
Leveraging AI & Environmental Monitoring Data For Predictive Hygiene



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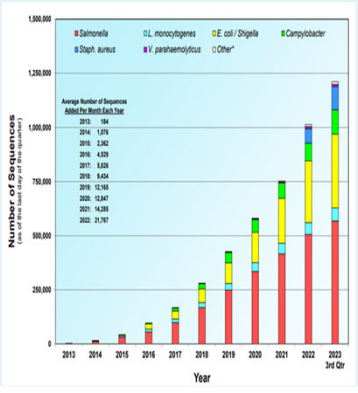
Tracing Global/Local foodborne Illness Through WGS Big Data

Sequencing Pathogenic Bacteria Associated with Illness

Building Databases of Sequenced Pathogenic Bacteria



Source Tracking Related Illnesses

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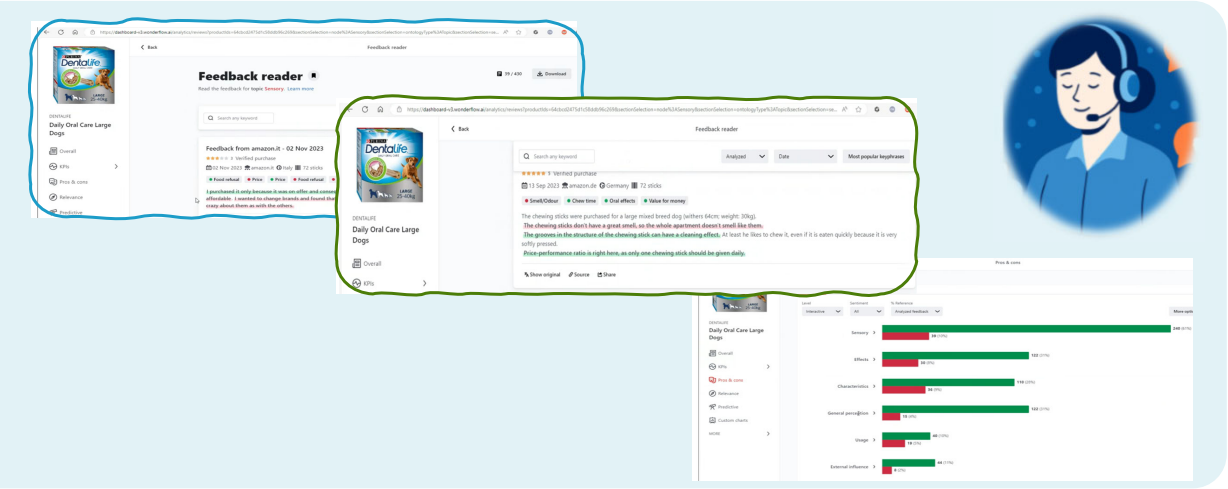
Using AI To Capture Product Feedback and Consumer Sentiment



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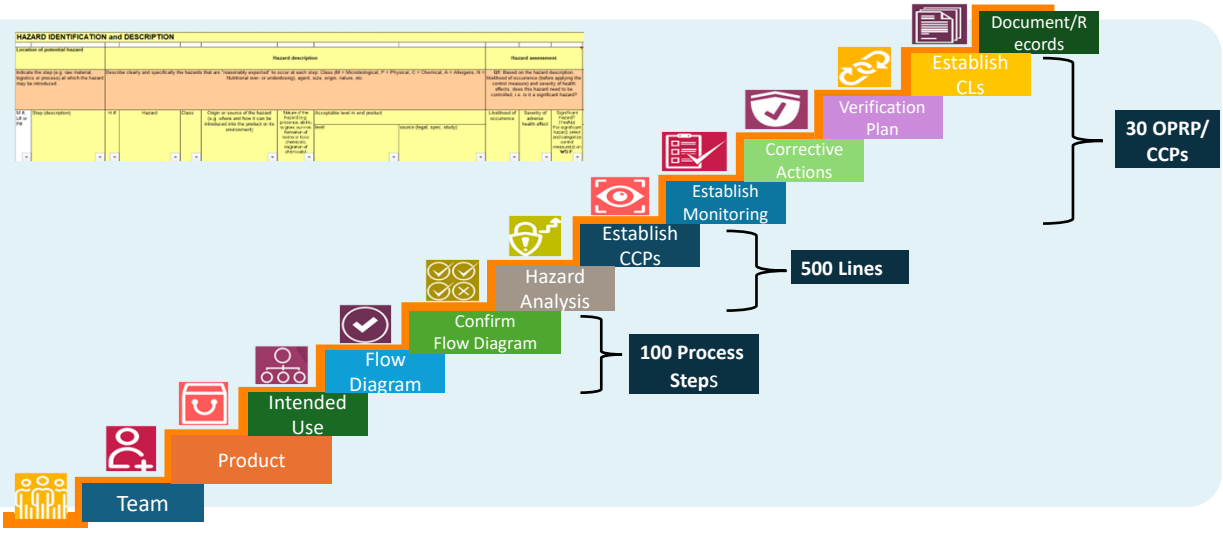
Digital Transformation of HACCP For Agility & Consistency



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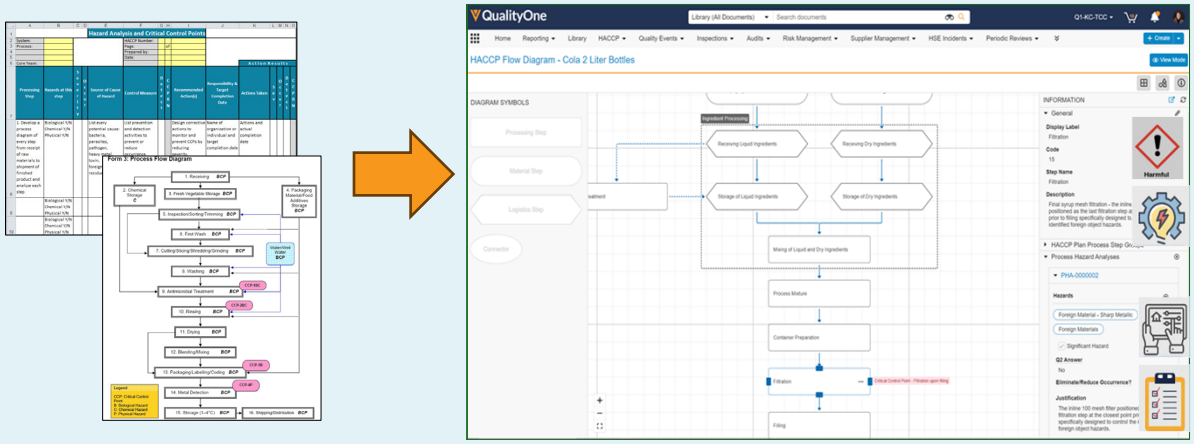
Digital HACCP: From Static Flow Diagram To Digital Cockpit



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Challenges, Barriers and Gaps to the Uptake of Big Data/AI derived Tools

- ❑ **Lack of Facilities for sharing of information between Countries, Authorities or Industry**
- ❑ **Cautiousness on Use of AI for decision making in food safety**
- ❑ **Challenges in data fairness & standardization (Findability, Accessibility, Interoperability and reusability (FAIR)**
- ❑ **Challenges with scalability and data storage**
- ❑ **SMEs (Food Safety Experts) must not be removed form AI derived analytical processes**

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