History of Traceability and Global Regulatory Systems Digital

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Traceability in Agri-Food Supply Chains: A Comparative Analysis of OECD Member Countries

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Digital Traceability in Agri-Food Supply Chains: A Comparative Analysis of OECD Member Countries

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Premise

Digital traceability systems extend to providing rapid response capabilities to food safety concerns, facilitating the precise identification of contamination sources, and effectively mitigating foodborne illness risks.

Hence, **national governments worldwide** embark on formulating and implementing policies aimed at integrating digital traceability within their agri-food frameworks [1]

1. Demestichas, K.; Peppes, N.; Alexakis, T.; Adamopoulou, E. Blockchain in Agriculture Traceability Systems: A Review. *Appl. Sci.* **2020**, *10*, 4113. [**Google Scholar**] [**CrossRef**]

Study Goal

Analysis and comparative review of traceability regulations, strategies for information dissemination, collaborative efforts among stakeholders, and regulatory frameworks concerning agri-food products across OECD member states.

Objective: to provide a comprehensive overview of each nation's efforts to integrate digital food traceability into their respective national agendas.

Ultimately: offer actionable recommendations and insights to policymakers, businesses, and other key stakeholders in the agri-food supply chain

Digital Traceability: An Overview

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Methodology

- **38 member** countries of the **OECD**, info gathered over 2 months
- Detailed **literature review** from authoritative sources (literature published post-2015)
- 7 member states excluded due to insufficient data availability: Luxembourg, Estonia, Mexico, Slovenia, Turkey, Costa Rica, and the Czech Republic
- Stringent **review process** with selection criteria: relevance to the digitalization of the agri-food sector, reliability of the source, geographic and temporal coverage
- Creation of an **evaluative matrix** incorporating six critical questions

Methodology: Framework
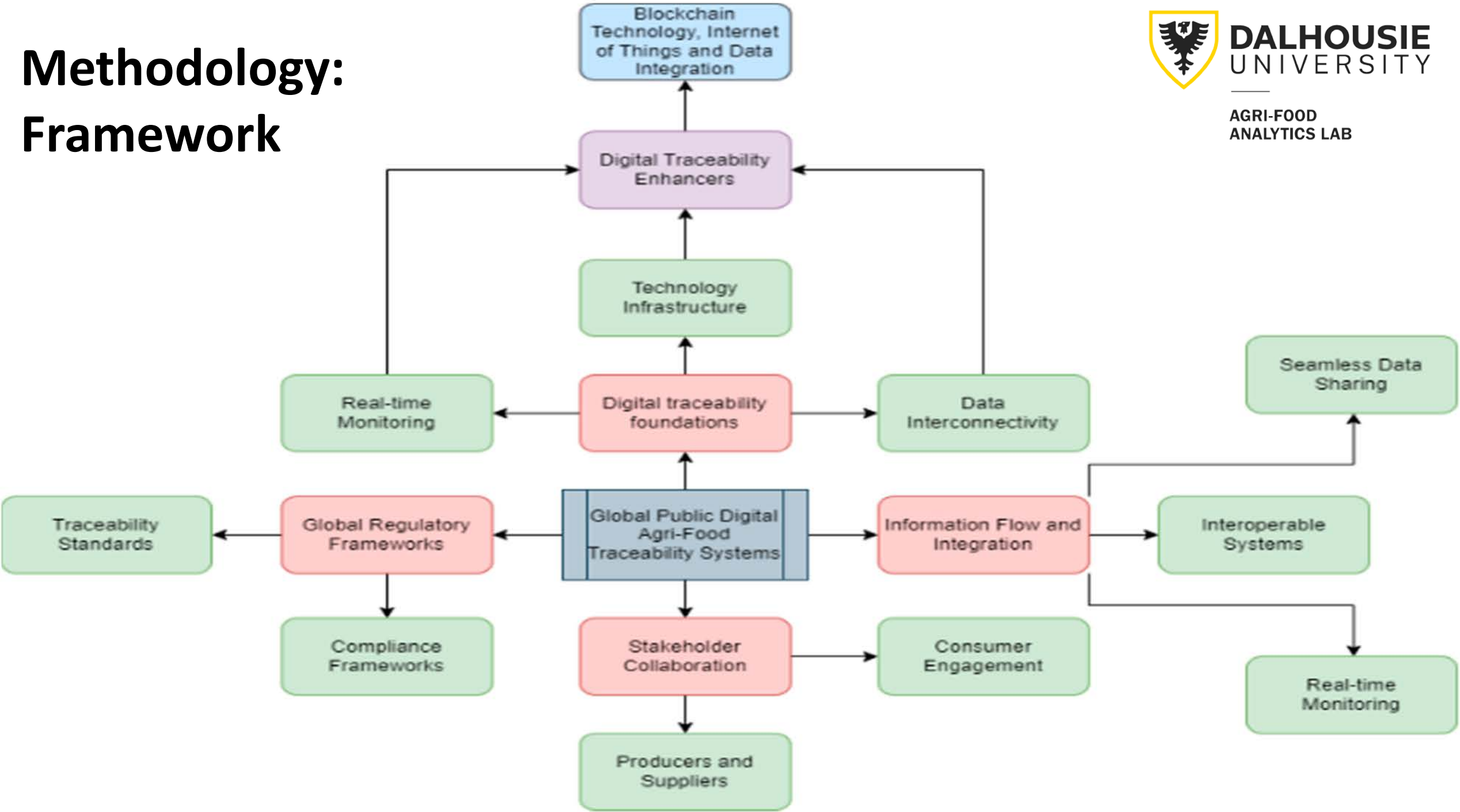
Methodology - Analysis

Qualitative

- Used to identify:
    - Key themes
    - Trends
    - Patterns in the data

Quantitative

- Quantify the extent of digitalization in OECD member states

- Statistical techniques, such as regression analysis: used to examine relationship between digitalization and various socio-economic factors.

Are there specific and well-defined digital traceability regulations or policies established at the national or regional level?

What are the guidelines and practices regarding digital traceability when it comes to imported products? What are the practices involved in that?

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To what extent is the regulatory authority responsible for overseeing digital traceability regulations?

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Within the agri-food supply chain of the country, which specific products or commodities are subject to digital traceability regulations and monitoring?

a) What forms of digital identifiers or codes are employed for tracking and registering imported products within the digital traceability system?

a) Does the country maintain an electronic database system dedicated to monitoring imports and exports, inclusive of their respective digital traceability data?

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What specific digital traceability information is provided on product packaging labels to empower consumers with insights into the product's origin and its journey within the supply chain?

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Table 2. Summary of country-level initiatives for digital traceability.

Countries	Summary of Measures Adopted to Improve Digital Traceability
Australia	• RegTech: Main technology for digital traceability. • Agrifood Connect Trace2Place: Real-time mapping of the red meat supply chain. • Digital exchange systems: Streamline data collection for risk assessment. • eCert: Electronic certification system for tracking imports and exports.
Belgium	• QR codes are utilized for food traceability. • Adoption of EU-led initiatives and policies.
Canada	• Limited adoption of digital traceability. • Participation in the GS1 global system of standards for digital safety. • Industry-led initiative: The Consortium of Parmigiano Reggiano partners for digital identifiers.
Chile	• Integrated traceability solution for Chilean seafood produce by Shellcatch. • Utilization of vessel, coastal, and scale cameras feeding data to a Cloud-based eMonitoring system. • AI-powered data collection, analysis, and management. • QR codes on products serve as digital identifiers.
Colombia	• Limited network coverage in rural areas hinders digital extension for traceability. • Government-led initiatives: Coffee Information System (SICA). • Emerging digital startups like Curuba Tech and platforms like Trusty.
Denmark	• Denmark lags in agri-food startup investment despite being highly digitalized.

Country	Initiatives
Finland	• Blockchain technology for supply chain transparency. • Implementation of AI for real-time updates on animal welfare. • Integration of IoT to automate blockchain technology for traceability.
France	• blockchain technology for real-time tracking and auditing of food products. • QR codes for product history.
Germany	• SiLKe project on blockchain technology for a safe food chain.
Greece	• Greece lacks specialized initiatives or guidelines for digital traceability
Hungary	• Hungary lacks specific initiatives for digitalizing food systems but plans to adopt digital technologies in the agricultural sector, aligning with EU guidelines. Top of Form
Iceland	• Blockchain-based lamb traceability, but no updates since, and reliance on non-digital food safety regulations. Top of Form
Ireland	• AI applications and ICT for traceability in food. • Part of Ireland's Food Vision 2030 strategy is embracing the digital revolution for improved food system transparency.
Israel	• Blockchain to provide consumers with detailed food product information, although no updates have been provided since 2020.
Italy	• Blockchain for certifying food product information. • IoT platform with IT service providers for digital traceability.
Japan	• Individual Identification Register system after the "mad cow disease" outbreak • challenges in fully digitizing traceability due to limited pilot project adoption and budget constraints.
Republic of Korea	• blockchain technology • QR code-based verification systems.

Latvia	• QR Codes • Mobile Applications with a traceability system in Latvia, • Fisheries Integrated Control and Information System by the Latvian Ministry of Agriculture.
Lithuania	• Artificial intelligence into digital traceability solutions. • Distributional blockchain systems integrated into the AgriFood sector.
Netherlands	• e-CertNL System facilitating the issuance of export and health certificates for agricultural products. • Blockchain Technology • QR Codes
New Zealand	• QR Codes • IDlocate: electronic database tool generating unique URLs for each food product. • Blockchain Technology • NAIT Scheme: tag animals and record their identities in the national database.
Norway	• eSporing Traceability Project: focusing on establishing electronic infrastructure for information exchange in the food supply chain. • Radio Frequency Identification (RFID) Technology: with GS1 electronic product code standards. • Blockchain Collaboration in the Seafood Sector
Poland	• EU Regulations Compliance • minimal independent initiatives in this area, with most systems remaining conventional rather than digitized.
Portugal	• Blockchain in Auchan Supermarket, TE-Food's traceability system. • a broader shift toward digital approaches in the agri-food and trading industry. • Adherence to EU Guidelines
Slovak Republic	• Blockchain in Food Supply Chain • Tracking Origin of Food within the entire Slovak retail sector.

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Spain	• Blockchain Technology
Sweden	• Digital "Product Passports" to inform consumers about the life cycle of products. • Barcode Evolution for both traditional checkout scanning and consumer access to product information via smartphones.
Switzerland	• fTrace Solution by GS1, which utilizes the Electronic Product Code Information Services (EPCIS) to record events along the supply chain and store processing steps in a cloud-based database. • TE's Hyperledger-based blockchain database enhances the sustainability of the food supply chain.
United Kingdom	• Blockchain and DNA Technology to address challenges, including consumer safety and international supply chains. • SecQual Consortium to enhance traceability with smart labels and digital IDs for products.
United States	• FDA's 10-year plan launched in July 2020 under the "New Era of Smarter Food Safety" initiative. • Food Traceability Rule, requiring records for manufacturing, processing, packing, or holding foods to be stored in a national electronic database. • Imported Food Products Regulation, requiring imported food products to comply with FSMA regulations. • Industry-Driven Initiatives.

Future Directions

& Conclusions
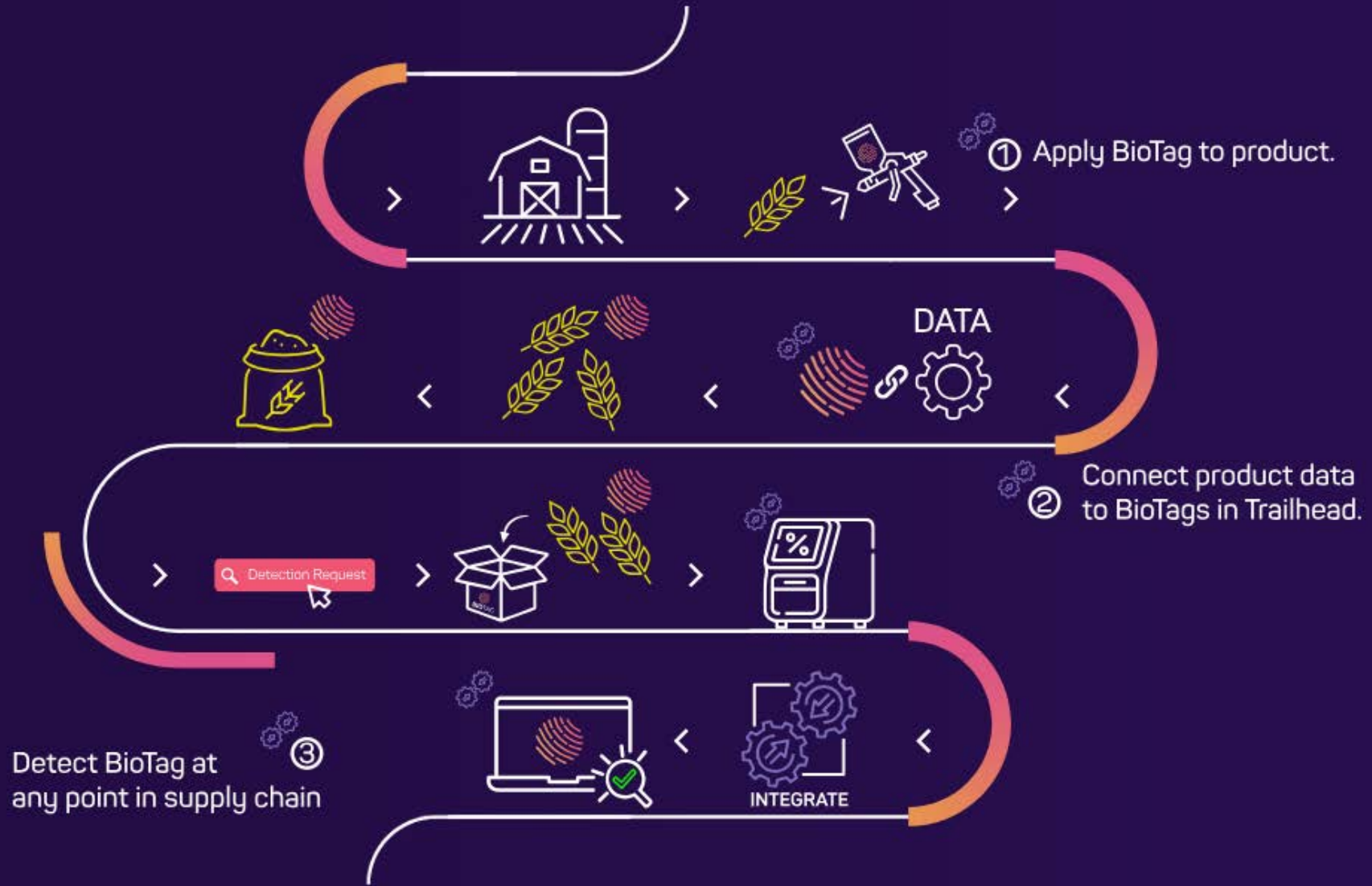
Source: https://www.indexbiosystems.com/

Discussion

Thank you !

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