Technical Brief



New Technologies and Food Safety Considerations

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Overview

This document covers a wide topic area and provides actionable guidance to support risk mitigation and identify the benefits and challenges of new technologies.

Examples of new technologies

New technologies are becoming integral to almost every aspect of food supply and production. Vertical farming is a good example of several new technologies. It brings together the use of robotics with Artificial Intelligence (AI) to optimise the growing conditions for the plants, by controlling the environment – the food, light and water. There could also be image recognition systems in place to assist detection of early signs of disease. At manufacturing sites, innovative techniques such as robotics and 3D food printing are being adopted. These technologies need to fit in with the demands of the food processing environment in terms of hygienic design, sanitation and maintenance. Smart packaging solutions [examples from the past include timetemperature indicators and atmosphere modifiers in Modified Atmosphere Packaging (MAP)] need to be properly assessed for food contact safety under all conditions of use.

The use of AI, Artificial General Intelligence (AGI) and Large Language Models (LLMs), have the ability to revolutionise data management, ideally as part of business digitisation plans and strategies. These technologies enable the analysis of vast amounts of data, making it useful for a wide range of applications such as predicting food and process failures through laboratory results, monitoring equipment to foresee machine failures and maintenance needs, and optimising energy use. However, these need to be properly evaluated and managed; AI is a tool, not a complete solution.

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Verify compliance with relevant food safety standards and regulations to address any gaps

Pre-implementation

Implementation

Post-implementation

Tasks	Project Enablers
Addressing misinformation	Acknowledge concerns and address myths with factual information
	Verify claims using independent sources and credible data
	Engage in open discussions with stakeholders to clarify doubts
Testing & verification	Test the new technology yourself; conduct trials with supplier collaboration at independent sites
	Review external data and studies on the technology, recognising that full testing or access to all data may not always be possible
Risk management	Avoid being the first adopter if risk reduction is a low priority
	Balance caution with the necessity of adopting new technology for progress
	Establish collaboration agreements with early adopters e.g. via suppliers
Testimonials & insights	Conduct an internet search on the supplier and read testimonials to gain insight from the experience of previous users
	Seek advice from retail partners, existing users, external specialists and mentors from other companies

Data evaluation & credibility	Source and reference data from open sources, approval lists, patents, publications, and audit reports	
	Commit to understanding and interpreting the data accurately; apply it to your operation	
	Determine the funding source to assess potential biases	
	Ensure data validation comes from independent and credible parties	
Supplier reputation	Research historical credibility and general reputation of the supplier company	
	Look for past case studies and success or failure stories	
Anticipating challenges	Consider potential unforeseen issues and risks	
	Recognise that sometimes problems only become apparent after adoption	

Implementation phases

Implementing new technologies in food manufacturing involves multiple stages:



Key business stakeholders

A multidisciplinary team is recommended, with representatives from various departments being involved in the project, for example:

- Finance: to manage the costs and set up the budget, as such projects can easily derail with increasing costs
- R&D: to present and manage the new technologies, processes or machinery/equipment being introduced to the business
- Technical and Quality: food safety compliance, HACCP study, risk assessments regarding equipment, technology, processes and packaging
- Engineering: installation and maintenance of the equipment/machinery
- Information Technology (IT): to manage the hardware and software associated with the equipment/machinery and processes
- Operations: to support the decision on the practicality of the project and acquire enough knowledge and understanding to be able to train staff accordingly
- Health and Safety: to ensure compliance with all regulations
- **Sustainability:** to understand the environmental implications of the project by managing resources such as energy, water and land (if applicable)
- **Hygiene:** to advise on the necessary cleaning processes

- Human Resources (HR): to understand and manage the needs in terms of expertise required, and number of staff
- **Procurement:** to create and evaluate appropriate buying specifications, before payment; assessment of vendors and management of tendering process.



References and further reading

- Starting a food manufacturing business safety and compliance road map <u>Starting a Food Manufacturing Business</u> <u>– Safety and Compliance Road Map</u> <u>A3.pdf</u>
- Setting up a food production facility: regulations/guidance to consider <u>Premises Technical Brief.vo2_0.pdf</u>
- Intellectual property (IP): how food businesses can maximise the commercial value of innovation <u>Intellectual property- How food</u> <u>businesses can maximise the</u> <u>commercial value of innovation_0.pdf</u>



Useful contacts and sources of support

- With consideration of confidentially, talk to: colleagues and wider networks, including IFST members; appropriate industry bodies, e.g. British Frozen Food, Chilled Food Association; consultants; universities; industrial partnership and specialist teams; research funding partners, e.g. UKRI
- Examples of organisations which food companies can contact, for support and verification, as well as to independently test technology (N.B. others are available) see below:

Regional Branches	Institute of Food Science and Technology (IFST)	<u>Link</u>
Business Innovation Centre	BIC	<u>Link</u>
Campden BRI		<u>Link</u>
The Food Incubator	Leicester	<u>Link</u>
Manufacturing Technology Centre	МТС	<u>Link</u>
Advanced Food Innovation Centre	Sheffield Hallam University	<u>Link</u>
National Centre for Food Manufacturing	University of Lincoln	Link
Innovate UK	UK Research and Innovation, UKRI	<u>Link</u>
Leatherhead Food Research		<u>Link</u>
Food Processing Centre	University of Reading	<u>Link</u>
ZERO2FIVE Food Industry Centre	Cardiff Metropolitan University	<u>Link</u>
Food Nutrition Research Innovation	University of Leeds	<u>Link</u>
European Hygienic and Design Group	EHEDG	<u>Link</u>
Nutrition Innovation Centre for Food and Health	NICHE, Ulster University	<u>Link</u>
Agri-Food and Biosciences Institute	AFBI	<u>Link</u>
Scottish Centre for Food Development and Innovation	SCFDI, Queen Margaret University, Edinburgh	Link
Digital Process Manufacturing Centre	National Manufacturing Institute Scotland (NMIS)	<u>Link</u>