

INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) APPLIED TO FOOD SYSTEMS

THE TOOLS FOR A FUTURE PROOF FOOD SYSTEM

FOOD 2030: INNOVATION



The 21st Century is living the advent of a digital revolution. The spread of mobiles and similar portable technologies, mobile applications, and easy access to the internet, are changing social behaviour at a very fast pace. This is also affecting the food system rapidly, where new applications and implementations are being developed in several areas. These include new sensors, internet of things, big data, Industry 4.0, robotics, augmented reality, digital twins, and at the top of the digitalisation concept, artificial intelligence (AI).

SPECIFIC R&I BREAKTHROUGH TOPICS

Full exploitation of big data: Data is the backbone of digitalisation. Therefore much development is needed in the food system to research how data is acquired, stored, processed, analysed and used. But social challenges arise and must be considered; transparency, integrity, ownership and validity of data, and ethics.

Internet of things (IoT): The IoT refers to the interconnectivity between machines and devices. Much of the development in the sector depends on this, which still requires research for full exploitation.

New sensors applied to multiple applications: Sensors are critical for the acquisition of data. Great developments are being advanced in smaller, resistant, and accurate sensors, the starting point for many digital applications, including biosensors.

Digitalisation of industry: The so-called Industry 4.0 starts by integrating sensor technology, data management, IoT, robotics, digital twins, and artificial technology for a more precise, efficient, and sustainable way of producing. In the food sector, many challenges arise as the source are living materials with many changing parameters, usually controlled by humans.

Robotics: Part of the greatest developments in some food sectors is due to advanced robots. Robots substitute humans in tedious and repetitive jobs, frequently adding precision and speed.

Augmented reality and digital twins: These technologies allow for simulations in almost a real replica of a process. It allows for a better use of resources, smaller timescales for development and better design.

Artificial intelligence (AI): Considered the paramount of digitalisation, it consists of creating algorithms that allow advanced and intelligent machine processes. It is the next step in robotics and mechanisation, allowing for operations that not even humans could achieve.

EXPECTED IMPACT

Applicable to many sectors in the food system, from the efficiency of industrial processes to new business models for interacting with consumers, ICT applications and digitalisation are breaking through in other sectors, but still undergoing development in the agri-food sector. It affects the way food is produced, processed, distributed, and consumed, with an impact that reaches deep into social, economic, and environmental elements.

MARKET OPPORTUNITIES / CHALLENGES

- Many technological advances are provided from other sectors, and much of the effort in the agri-food sector is dependent on the development and implementation of such technologies.
- There is a gap between the current skills and the needed skills for workers to adopt many new digital technologies. The skills gap is both a barrier and an enabler; a barrier to the current workforce and systems in place, but an opportunity to upgrade talents and attract a younger generation.
- There is ongoing investment from the public and private sector in digitalisation, and there is a political will and a social preparedness to adopt many of the incoming innovations.
- Environmental sustainability might also benefit from adoption of digitalisation. Processes become more efficient, there is an optimisation of resource use, and there could be advances at citizen level, such as a more coherent food waste management for example.

EXAMPLE REFERENCES

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ASSOCIATED TRENDS IN FIT4FOOD2030 (URL)

- Industry 4.0 - Digitisation in food industry
- Big data analysis
- New and game-changing digital technologies in agriculture
- Blockchain technology for secure food supply chain
- Consumer engagement
- Social media and food
- New shopping behaviour
- Physical internet

ASSOCIATED CASES IN FIT4FOOD2030 (URL)

- Rethink Recourse
- eFoodChain
- FhytI Signs
- Winnow
- Flourish
- Starling
- Ida by connecterra
- AutomonPH by Waterice
- Iron Ox

