

Foodtech is vital but difficult, and the market is fragmented: all stakeholders need to do more

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The world's population is growing, and food demand will have increased significantly by 2050 compared to 2016.¹ The food supply chain is currently responsible for 28% of total greenhouse gas emissions and this share is increasing rapidly.² Tackling these challenges requires technical innovation and has given rise to a growing foodtech market that offers precision agriculture, smart urban food solutions, and supply chain transformation leveraging sensors, drones, AI and cloud technology. Many foodtech innovations allow for improved resource efficiency of the agriculture industry³ but are each dependent on increased technology adoption and reliable connectivity, which may be challenging to achieve.

There are several challenges on the road to smart and fully connected farms

In a recent study, Analysys Mason shed light on some of the key barriers for smart, connectivity-based solutions in the agricultural sector. They include the following.

- **A diverse ecosystem: on the demand side, there are many different stakeholders in the agricultural ecosystem.** They include, but are not limited to, government and agricultural policy makers, regulators, suppliers such as seed and fertiliser companies, original equipment manufacturers (OEMs) that design agricultural machinery and vehicles, and agricultural consultancies. Navigating the ecosystem and addressing the requirements of multiple stakeholders is complex.
- **A fragmented supply chain: the agriculture supply chain is fragmented and characterised by many small companies and only a few large ones (for example, John Deere, Monsanto).** The many small start-ups that characterise the growing foodtech industry are creating innovative solutions but it is difficult for connectivity and solutions providers to identify technology partners and routes to market.
- **Scalability: there are national variations and differences in regulations to address.** The structure of the market in each country differs; some are formed of a few large commercial farms, others of numerous smallholdings. Governments may have established quota systems or subsidies, which by their nature may undermine the incentive to increase productivity and hence adopt new technologies.
- **Connectivity: the agricultural sector has diverse connectivity needs to support mobile and static applications, both indoor and outdoor.** Operators have already started to deploy narrowband networks (for example, NB-IoT and LTE-M) but 5G is required for more advanced use cases such as autonomous

¹ Elferink, M., & Schierhorn, F. (2016). Global Demand for Food is Rising. Can we meet it. *Harvard Business Review*, 7(04).

² Poore, J., & Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. *Science*, 360(6392), 987–992.

³ World Economic Forum (2018). Harnessing artificial intelligence for the Earth. http://www3.weforum.org/docs/Harnessing_Artificial_Intelligence_for_the_Earth_report_2018.pdf.

farm equipment. However, much of the world's food production is in rural areas, which are a low priority in operators' roll-out plans.

Analysys Mason is working with stakeholders in the foodtech industry to address these challenges in Sweden

By providing expertise and connecting the stakeholders, Analysys Mason is helping to facilitate cutting-edge innovation for a digital bioeconomy.

- On behalf of the Nordic Council of Ministers, Nordic Agri Research and Nordic Forest Research, Analysys Mason was commissioned to investigate how the Nordics could take advantage of the digital transformation that is reshaping the agricultural and forestry sectors. Based on a policy overview and an international multi stakeholder workshop, a decision was made to establish a Nordic network of testbeds supporting a digital bioeconomy. Analysys Mason facilitated this process over the last few years and has coordinated and grown the network, which today includes cutting-edge innovative test environments such as for connected animals and precision farming.
- Together with researchers from the Swedish University of Agriculture, Analysys Mason initiated and managed a pilot study to explore the development of smart urban agriculture (initiatives where food is produced in closed, controlled and digitally augmented environments, such as vertical farms, plant factories and aquaponics systems). The report highlights that food production–consumption systems are excluded from high-level policy agendas on smart cities and digitalisation, suggesting that institutional arrangements (for example, food policy and urban planning) are constraining development and take-up of smart urban agriculture.
- Analysys Mason has been appointed to evaluate and support a regional state-funded initiative Foodtech Innovation Network in the south of Sweden. This multi-stakeholder initiative (including researchers, public bodies and private sector representatives) will run for 3 years (2020–2023) and aims to support the development of a vibrant foodtech community including the establishment of new, and growth of existing, foodtech firms.

The foodtech industry is immature but evolving rapidly, and policy makers have a key role in facilitating new technology

Driving innovation in the foodtech sector requires a multi-stakeholder approach. Researchers need access to funding, end users and testing environments. Farmers need to have incentives to adopt technology that improves productivity and reduces greenhouse gas emissions. Farmers and other companies in the agriculture sector need help navigating current and future technology and connectivity options to overcome concerns about investment, expected benefits and data security.

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