



Editorial

Innovation in agriculture and the agri-food chain: Some insights

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Research and innovation in sustainable food systems is a focus of public policy, such as that of the European Union. It has become evident that business-as-usual market patterns are not compatible with the growing demands of environmental and social sustainability.

Population growth, urbanization, migration, resource scarcity, climate change, and environmental degradation [1] are creating increasingly urgent and complex challenges.

Therefore, agri-food systems, research, and innovation need to combine a new production and consumption paradigm, resulting in new sustainable, resilient, inclusive, and healthy market opportunities to achieve the UN Sustainable Development Goals and to realize the policy objectives of the EU Farm-to-Fork strategy and Green Deal.

This Editorial aims to report a critical reading of some examples of innovation in the agri-food sector, with the objective of concluding the discussion opened by the ten research articles published in the AIMS Agriculture and Food in the Special Issue: Innovation in agriculture and the agri-food chain.

Several studies demonstrated the importance of product innovation to increase visibility, accessibility, consumers' loyalty and purchasing intention. Stakeholders in the agri-food chain can act at various levels to implement innovative solutions in the production process or during product development/renewal. Process/product improvement strategies must include market analysis considering, among other things, the study of the consumer in order to successfully define product positioning in the minds of potential buyers of the innovative product. Product innovation strategies include those that renew the image of the product itself, which can be transformed from "conventional" to "certified", "sustainable", and "safe".

At the supply chain level, a sustainable production system, perhaps certified, represents a product enhancement factor to which consumers show increasing attention when choosing food products. However, the inclusion of this choice attribute is product/specific: as shown in Merlino et. al [2], for

example, product characteristics attributable to the environmental sustainability dimension carry less weight during the assessment of product quality than convenience and safety attributes in ready-to-eat products, such as fresh-cut salads. On the contrary, product sustainability, encompassed in its social, economic and environmental dimensions, ascribable to traditional and/or extensive food production systems, becomes a discriminating factor in the choice of 'mountain' or 'local' products, as e.g. Brun et al. [3] demonstrated in the case of honey. At the same time, the assessment of the sustainability of the supply chain, supported by technological innovation and the circular economy, is considered an important factor evaluated by the various countries of the European Union both in traditional supply chains and, above all, in novel food supply chains, in order to assess their feasibility and durability in the long term [4].

From another perspective, the transition to an innovative supply chain can be interpreted as the inclusion of advanced practices and management changes made in order to increase food security and health [5,6]. In fact, as described by [7,8] in traditional traceability management systems often involve considerable bureaucratic, economic and managerial effort on the part of companies, especially small and medium-sized enterprises, which make up most of the food sector. The same authors, moreover, starting from a thorough literature review, developed a low-cost open-source traceability system focused on food safety and quality. In order to encourage the adoption of inexpensive and management-sustainable traceability systems with ultimate benefits for producers, retailers and consumers [7,8].

In the latter projection, the increasing of traceability efficiency systems [6], also using technological approach as the blockchain system [9] can favor the management of traceability systems also for small and medium-sized enterprises and increase the transparency of the supply chain in the eyes of consumers. In particular, Osei et al. [9] identified the novelty of the technology, supply chain characteristics, open data issues, cost-benefit analysis, and role of public stakeholders has the main factors affection the Blockchain technology adoption, in particular in fresh-food supply chain.

Product innovation, on the other hand, besides involving intrinsic product characteristics, often includes a decision-making process about the packaging image. Packaging is the factor most involved in communication strategies as it is the part of the product that most directly interacts with the consumer during the choice process. However, some sectors are characterized by anonymous, standardized packaging that can hardly compete with nascent competitors: cow's milk vs. vegetable drinks, for example. Despite the fact that the cow's milk sector has been going through a critical moment for years, both in terms of consumption and production, packaging could nevertheless represent an appealing and differentiating tool for consumers. In fact, the study by Merlino et al. [10] showed how consumers are willing to buy and spend a premium price for innovative, more environmentally sustainable packaging, but also characterized by a more convenient and practical opening system. An innovative packaging, in the case of craft beer [11], was evaluated as a tool for product novelty by assessing the acceptability of the use of the can by a sample of consumers. In conclusion, this research shows how a target of consumers accepts the use of the can for craft beers. This work showed how the can represents a key positive element for innovation as, not only could it be accepted by consumers, but it can accommodate attractive graphics, also providing logistical advantages over the traditional glass.

These studies thus demonstrated the impact of process and product innovation on production efficiency, safety, healthiness and product quality. Innovation, undertaken in its various perspectives, can therefore represent a tool for growth and improvement of company efficiency, thus becoming a tool for enhancing and differentiating products on the market.

Conflict of interests

The authors declare no conflict of interest.

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