RETASTE Conference Abstracts
Vol. 2 RETASTE-TFM-218-Oral
Herakleion, Greece, 20-21 October, 2022

Digitalization for food waste: Keeping up with technology for a sustainable future

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Abstract

Food security and food waste reduction dominates in at least 10 of the 17 Sustainable Development Goals (Andreopoulou, 2017; Durán-Sandoval et al., 2021). While half the issue lies on the increased demand of high-quality food products, the other half is based on the fact that according to several studies, at least one-third of food production is wasted along the line of the supply chain contributing at the same time on the massive production of CO_2 (Parfitt et al.,2010; Kummu et al., 2012; Lemma et al.,2014). There is an increasing need for monitoring of food processing along the supply chain to diminish these effects. It has been shown, that the use of digitalization like the Internet of Things (IoT), artificial intelligence, virtual reality, blockchain and other communication technologies can be used to improve traceability and sustainability of waste products, even during a global crisis like the COVID-19 pandemic (Andreopoulou, 2017; Peña et al.,2020). As digital technologies like IoT can provide a huge network of communicating devices without the involvement of humans, it has been shown that shared information improves decision making processes involving the quantities necessary in a supply chain (Peña et al.,2020). The ability to access information about products remotely as well as the movements of the products along the supply chain, from the field to the customer and back to the field, especially in high quality fresh products with a limited shelf-life like fruits and vegetables, can help in the development of sustainable strategies and solutions in line with Circular Economy for both the reduction of food losses but also food waste (Tagarakis et al., 2021). The digitalization of the food industry can be a base pillar for food waste management which constitutes at least 40% of the waste disposed in landfills (Zorpas et al., 2015; Tagarakis et al., 2021). Not only that, from the management of disposable food packaging to the monitoring of biogas energy from food waste, a route to Circular Economy can be provided concerning food products beyond their end of their shelf-life through digitalization technologies (Valoppi, 2021). The current paper reviews the existing digitalization methods used in the food industry and how innovative modern infrastructures involving digitalization can be used as tools to help the world achieve food security and increase the global awareness on food waste for the sake of future generations. The contribution will provide a collective review of existing methods for digitalization while it will highlight the necessity, impact and opportunities of

digitalization techniques in the food waste sector for better monitoring and recording food waste in all parts of the production chain.

Keywords: Internet of Things (IoT), Digitalization, Food waste, Circular Economy, Sustainability.

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