Factors influencing innovative circular business models in the Mediterranean olive oil value chain

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1. Introduction

The production of olive oil generates vast quantities of waste (wood, branches, leaves) and by-products (olive pomace, olive mill wastewater, olive stones) (Roselló-Soto et al., 2015; Berbel and Posadillo, 2018) that imply risks of natural resource depletion, phytotoxic effects, and water pollution (Azbar et al., 2004, Paraskeva and Diamadopoulos, 2006). Such risks can influence the environmental protection and resilience to climate change crisis and water scarcity, being some of the core Mediterranean challenges[1]. Thus, the enterprises involved in olive oil production are facing multiple stimuli for a transition towards circular business models and better waste management, pushed institutionally by the regulations (and especially regarding water), societal demands, and resource scarcity. Waste and by-products from olive oil production should not only be considered from a mere 'management or treatment' point of view. Still, they can offer opportunities to be valorised, i.e. to be converted into new value-added and marketable ingredients and products, potentially leading to additional farmers' incomes and a more sustainable and environmentally resilient olive oil value chain.
Business models explain the way an enterprise works and "articulate the logic, the data and other evidence that support a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value" (Teece, 2010). Circular business models are a subcategory of business models, which incorporate circular economy principles as guidelines, aiming to fully close product or material loops (Bocken *et al.*, 2019; Donner, Gohier and de Vries, 2020), proposing the creation of value from waste or providing functionality instead of products (Bocken *et al.* 2014). Suchek et al. (2021) suggest business model innovation as one of the topics in their future research agenda for circular economy advance research.
The objective of this work was to understand the factors that influence enterprises to switch to circular business models by valorising olive waste and by-products (for food and non-food applications). We aimed at enterprises from the olive oil sector, either involved in olive oil production or specifically creating value from olive waste and by-products, utilizing multifunctionality of the olive tree and enhancing alternative performance within and beyond the traditional patterns for value creation. Our hypothesis was that these enterprises are influenced by a set of internal and external success factors and barriers.

2. Methods

The methodological approach for this study was qualitative content analysis. Firstly an online search for olive oil company websites was performed to mark the ones with indications of waste or by-product valorisation, which resulted in a database of 41 enterprises of interest. Snowball sampling was employed to get referrals from COLIVE project partners and experts in the olive oil sector to contact the enterprises. The criteria for selecting the enterprises were the diversity of countries and their contexts; diversity of types of initiatives (but, e.g. specialized in waste valorisation vs. non-specialized, family business vs. cooperative, small – large-scale); and business model elements – i.e. the diversity of resources and value propositions. The search resulted in ten cases of entrepreneurial initiatives from the following Mediterranean countries: Tunisia (2), Morocco (1), France (1), Spain (1), Italy (2), Greece (3). For each case, as a preparation, the data available online was compiled (website, videos, articles), and further, semi-structured interviews were conducted with the responsible persons from the enterprises. For the two cases in Tunisia, a field visit was done. Interviews were conducted in English, French, Spanish and Italian language. The essential data of each case was synthesized as follows: name and type of initiative, country and region, principal or side activity, context and background of the enterprise, type of resource valorised, valorisation pathway, and outputs (products) including the enabling and hindering factors and socio-institutional context. The specific focus was on enabling and hindering factors, socio-institutional context, and the role of public policies.

[1] https://www.iamm.ciheam.org/en/about/ciheam/strategic_agenda_2025/challenges

3. Results

Results indicate that two types of enabling and hindering factors influencing the implementation of circular business models exist, internal and external factors.

The principal internal enabling success factors are an environmental concern, resource availability, knowledge about waste valorising technologies and markets, and long-term presence in the sector. The olive oil enterprises can be characterised by their involvement in the circular economy, caring for the environment, especially in the context of water, its scarcity and toxicity of wastewater, and whose enterprise managers are convinced that for the continuation of their activity, there is a need for more sustainable practices, and logistics (territorial synchronized collection of waste has to be well organized and the proximity between the waste generation site and waste valorisation site has a crucial role). The external factors enabling successful implementation of circular business models are legislation and public subsidies, the consumers' role, and circular economy embeddedness in the territorial agenda. Legislative obligations, in particular for the treatment of wastewater and regional norms for the preservation of landscapes, are another push for enterprises to adopt circular economy principles.

Two important hindering factors or challenges for the enterprises are both strong managerial implication (internal factor) and (financial) support from experts, policy and decision-makers (external factor). Firstly, even though the olive oil sector urgently needs subsidies for investments in waste valorising activities, the enterprises do not have any specific support measures. The role of waste management activities is recognized but not supported in practice. Secondly, the much-needed collaboration between enterprises and research centres or universities is rather complicated.

4. Conclusion

Utilizing waste and by-products from the olive oil-producing activity is a long-lasting practice, considering that soap and pomace oil are produced for centuries already. The pioneers in the field are now well-established enterprises showing success also in further innovation in circular business models. The entrepreneurial initiatives involved in olive oil waste and by-product valorisation are using multiple olive tree resources, employing different valorisation pathways, and are an example of an alternative performance of existing olive tree resources both in the olive plantation field and in the processing facilities, providing alternative resource use, and enhancing the economic and environmental resilience of the olive oil value chain.

The sustainable image of an enterprise and its resilience over time is often a driving factor for a further transition towards sustainable and circular business models to keep the promise to clients for engagement in environmental sustainability. The enterprises implementing circular economy business models are driven by a commitment to the environment, in particular, because of the unused high amounts and partly environmentally harmful residues (Donner and Radić, 2021). Mainly in the countries of the north side of the Mediterranean region, legislative obligation, particularly for the treatment of wastewater and regional norms for the preservation of landscapes, is undoubtedly a push for enterprises to engage with a circular economy transitioning towards circular business models. A common feature observed among all the cases is territorial embeddedness as a motivation for implementing circular activities and as a success factor. The most critical discrepancy among the cases regards external support and partnerships.

Despite the positive trends among businesses, olive waste and by-product valorisation, especially for higher added-value applications, is not yet well-established. The question is why. The knowledge transfers from the research level to the implementation in the field and the articulation of needs for research from the enterprises' side represent challenging tasks. More public-private partnerships or multi-stakeholder collaborations, e.g. via joint projects, are needed for further shifting to a circular economy.

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Acknowledgement: The COLIVE project (www.coliveproject.com) has been funded through ARIMNet2 (ERA-NET grant no. 618127).