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# CIRCULAR ECONOMY MODELS, POLICY IMPACTS IN THE AGRIFOOD VALUE CHAINS

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## Background

Circular economy is a new approach to the economy-environment pairing that has the potential of revolutionising the history of economic development models. This model is opposed to the traditional production pattern in which resources are extracted, used to produce goods and, eventually, landfilled. Circular economy supports a complete recycling of materials and implies a complete reorganization of production systems in which all steps of value chains are planned in order to use waste as input of new productions. Furthermore, it implies that consumers actively participate in closing the loops.

Circular Economy represents an opportunity for the industrial system, enabling savings of €1,800 billion by 2030 in Europe and ensuring a high positive social impact (+ 580,000 employments), as highlighted in a recent study by Ellen MacArthur Foundation and McKinsey (1). The European Commission, recognising the potential opportunities, also provides up to €650 million in funds, which are included in the Horizon 2020 Programme. Moreover, the European Investment Bank plans to allocate about €24 billion of funds fostering innovative initiatives by 2020, including those related to the Circular Economy (InnovFin financing tool and advisory services) (2).

The implementation of the circular economy approach requires a deep and exhaustive intervention on usual production methods, technologies, policy stimulus and incentives, consumer acceptance.

The transition towards a more resource-efficient society is a core goal of governments in Europe as well as worldwide. The European Parliament recently adopted an ambitious new Circular Economy Package to boost competitiveness, create jobs and generate sustainable growth.

Circular economy comprises an integrated approach to the resource necessitating the cooperation of all stakeholders along the value chain.

Innovative industrial processes and different markets should be developed to seize the opportunity that the Circular Economy paradigm provides. As part of circular economy, the focus on areas such as agriculture, food production, chemical industry, biotechnology, biomedical and energy is essential to guide the business and the future entrepreneurs towards a sustainable future, creating a solid relationship with the world of R&D and start-ups.

The attention is focused on the 'Institutional structure of production' (Coase R., 1992) (3) of **typical 'district areas'** in the context of the net-economy based on SMEs in growing globalisation. By deepening and analysing roles and interaction amongst the 3 players of the "triple helix model of innovation" (Etzkowitz and Leydesdorff, 1995)(4), the research aims to investigate the microeconomic, technological and policy elements involved in the economic transformation process, focusing on common strengths and constraints. The study starts from a perspective according to which the single value chains (and the respective criticalities intended as driving factors of the innovation process) are not sufficient to explain the change in productive paradigm and innovation.

## Objective of the research:

The research is aimed at investigating 3 cases studies (each of them characterised by 3 different inputs in the different innovation processes) from the following perspectives:

- the technological side, by analysing value chains/supply chains in order to pinpoint technological and/or organisational innovation in response to exogen/endogen stimuli and potentially detecting further innovation and/or circular integration;
- the economic side, by analysing micro-economic/eso-economic contexts, behaviour and performance of Industrial Districts and SMEs involved in the innovation process;
- the policy/regulative side, in order to investigate technical conditions and the automatic formation of incentives vs. organisation of resources and distribution rules, institutional action and normative constraints to the innovation process.

## Strategy

The intervention strategy of the research starts from the analysis of 3 main case studies in Agrifood value chains, which are paradigmatic for the understanding of how the innovation process and circular economy approach could be triggered, as well as which type of factors take part in this process.

The research aims to deepen and highlight the importance of the synergies between local production chains in the innovation process in response to both endogenous and exogenous stimuli and/or threats. The enterprises (agricultural and industrial) are linked by a network of inter-industrial relationships involving the mutual supply of specific products, essential for the production process of each player (Bertolini and Giovannetti, 2006) (5). Technological innovation impacts are ambivalent; they affect multiple actors of local Industrial Districts both in a negative and a potentially positive way: SMEs and Industries with a low rate of technological assets could exit the supply chain or invest in innovation and specialisation in order to effectively respond to exogenic stimuli.

### Market pull



Parmigiano Reggiano

**Focus on:**  
innovation process triggered by the achievement of Protected Designation of Origin (PDO) in order to adequately compete in broader and competitive markets and responding to the challenge placed by globalization.



### Policy push

Sostinnovi  
(ESRF – ROP Emilia-Romagna  
2014/2020)

**Focus on:**  
Potential further technological exploitation of by-products from winemaking.



### Technology push

Scalibur  
EU H2020-SFS-2018-2020

**Focus on:**  
urban food waste and sewage sludge into high value-added products and in particular Household biowaste and Horeca and retail biowaste.

## References

1. <https://www.ellenmacarthurfoundation.org/news/circular-economy-would-increase-european-competitiveness-and-deliver-better-social-outcomes-new-study-reveals>
2. <http://www.eib.org/infocentre/press/releases/all/2015/2015-299-eu-opens-up-eur24bn-of-existing-finance-to-circular-economy-businesses-in-support-of-eu-climate-goals.htm>
3. Coase, R. 1992 The institutional structure of production, American Economic Review, 82 (4): 713-719.
4. Etzkowitz E. – Leydesdorff L. 1995, The Triple Helix - University-Industry-Government Relations: A Laboratory for Knowledge Based Economic Development, EASST Review 14 (1995, nr. 1) 14-19