DESIGN AND TECHNOLOGY. PEOPLE, SYSTEMS, ENVIRONMENT

DM 630/We are Bi-rex srl - Systemic design for the industrial valorization of agro-food by-products from transnational value chains

Funded By	We are Bi-rex srl sb [P.IVA 12691610963] MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584]
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Context of the research activity	The research employs a systemic design approach to examine transnational value chains of cereal, coffee, and sugar. The objective is to identify new opportunities for circular business development through the valorization of by-products. Additionally, the research analyzes various territorial and national contexts to determine sustainable development strategies for the involved communities, with a focus on understanding the impacts of circular initiatives on inherently global value chains. Progetto finanziato dal PNRR a valere du DM 630 2024 sotto condizione, CUP E14D24002360004. The activation of the position with scholarship is subject to the possible allocation of further funding by the MUR.
	The transition to a circular economy is an environmental, economic and social urgency for our socio-technical and production systems, representing also a terrific opportunity for our industries. This transition entails a dual approach, addressing both upstream and downstream processes to implement industrial green process productions and, at the same time, to valorize and reuse agro-food by-products and waste. If the process is transparent for local supply chains within a specific geographical area, the transition to a circular economy presents greater challenges for value chains operating on a global scale. Specifically, the cereal, coffee, and sugar chains extend beyond local and national boundaries, involving organizations and stakeholders from different countries. Nevertheless, they possess significant cultural value and the by-products they generate, in both quality and quantity, deem them highly relevant from a circular economy perspective. In this context, Systemic Design can provide theoretical and methodological

Objectives	tools to develop new circular models and to increase the sustainability and resilience of industrial systems. Following a systemic approach, in which the output of a system becomes the input for another productive chain, this research aims to improve and exploit the embodied value of waste and by-products derived from agro-food transnational value chains. Through the integration of technologies and strategies, as well as the knowledge of different territorial contexts, industrial and agricultural waste and effluents can be enhanced into high-value products. This enables new local dynamics in which waste is the input of new processes, generating relevant impacts from an environmental, socio-cultural and economic point of view and contributing to ecologic transition, sustainable resource management, innovation and new job creation. Special attention will be devoted to local sustainability, through the comprehensive analysis of diverse territorial contexts from environmental, social, cultural, and economic standpoints, with the goal of establishing forward-looking paradigms for innovative industrial models. The research will be carried out in collaboration with the company Bi-rex srl sb, an innovative start-up committed to the circular economy. The PhD candidate will work closely with the Bi-rex team, who will contribute vital expertise in the valorization of by-products from the agro-food chain, particularly in transforming them into sustainable fibers suitable for producing environmentally friendly high-value products like paper and packaging.

Skills and competencies for the development of the activity	- Advanced knowledge of Systemic Design methodologies and tools. - Ability to develop a Holistic Diagnosis of production processes and territorial contexts, analyzing complex flows of energy, materials and information. - Previous experience in the study and definition of systemic strategies for the valorization of agro-food by-products.