POLITECNICO DI MILANO

PhD in INGEGNERIA GESTIONALE / MANAGEMENT ENGINEERING - 38th cycle

PARTENARIATO PNRR Research Field: MEASURING THE ADOPTION OF CIRCULAR TECHNOLOGIES AND PRACTICES IN AGRIFOOD VALUE CHAINS

Monthly net income of PhDscholarship (max 36 months)
€ 1450.0 In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	The PhD research project is aimed at improving the capability of agrifood systems to measure the incidence and impact of circular economy options at firm and industry levels. In detail, the PhD candidate should design, adapt and experiment a measurement method that returns information about the adoption of prevention, reuse and recycling technologies and practices in a large sample of agriculture and food transformation enterprises, including the relationship with drivers such as, for example, product types, enterprise characteristics. Secondly, he/she should propose innovative methods that are suitable for assessing the potential of emerging technologies and practices, whether established, large and multinational enterprises or younger and smaller enterprises are involved in innovation development or adoption. The project has several motivations. Agrifood losses and waste occupy a prominent place in SDG targets related to agriculture and food (FAO, 2021; UNEP 2021). A widespread adoption of circular strategies is necessary to optimize resource efficiency, to enhance food and nutrition security, to mitigate carbon emissions and other externalities (FAO, 2018; European Commission, 2021). Firms and their stakeholders can support the sustainable development process only if they are well informed about the impact of their current and planned actions, but radical changes are necessary in the conventional corporate accounting of sustainability (Schaltegger et al. 2017). In

	the case of agrifood circular strategies, despite the decade-long methodological efforts of international policymakers and academic researchers, information on food waste and losses is highly incomplete at country levels (FAO, 2021; UNEP, 2021), and only selected enterprises, generally part of pilot networks,nhave produced and disseminated their SDG 12.3 indicators (e.g., the Courtauld Commitment associates, WRAP 2022). Information on how the different circular strategies are adopted is even more difficult to collect, also because qualitative research shows that the incidence of alternative options is very heterogeneous across firms and industries (stages) (Bartezzaghi et al., 2021 and 2022). Knowledge on adoption of circular strategies is especially poor for emerging technologies (e.g. adoption of bioeconomy technologies in agriculture; Caldeira et al., 2020; European Commission's Knowledge Centre for Bioeconomy, 2020; EIP-AGRI Focus Group, 2020), also because of their numerosity and the limited disclosure of information from firms that are deploying them. The scholarship is funded by a PNRR grant (Centro Nazionale per le Tecnologie dell'Agricoltura, AGRITECH).
Methods and techniques that will be developed and used to carry out the research	After reviewing scientific and grey literature, the PhD candidate will conduct the research by the means of multiple methods. He/she may design and administer a survey over a sample of Italian farmers and food transformers. Collected data may be used not only to obtain estimates of the incidence of different circular strategies, but also to test the relationship between adoption likelihood and industry, firm, product-level explanatory drivers. Further possible methods include content analysis. Innovative indicators could be developed and tested to capture the adoption potential of the newest technologies. Lastly, quantitative and qualitative analysis of agrifood startups strategies, characteristics and performances could also be leveraged.
Educational objectives	The involved PhD student will learn (i) to understand and analyse sustainable technologies and practices in agriculture and food transformation; (ii) to design and apply innovative methods for measuring circular economy

	adoption at firm and industry levels; (iii) to interact with public and private stakeholders for research and policy purposes
Job opportunities	Upon PhD completion, the candidate may be tasked with empirical research activities in interdisciplinary groups engaged with sustainability-oriented transformation, also developing competences for team leadership roles. Public sector agencies and international organizations engaged with policy design and assessment are also a prospect employer, along with consulting organizations that advise agri-food companies and authorities on sustainable innovation, as well strategy and development functions in agri-food and technology providers companies.
Composition of the research group	4 Full Professors 2 Associated Professors 2 Assistant Professors 5 PhD Students
Name of the research directors	Prof. Paola Garrone

Contacts
paola.garrone@polimi.it

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	725.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
The PhD candidate will have the opportunity to attend courses on Management Engineering methods, sustainability-oriented innovation and agri-food sustainability at Politecnico di Milano and other Universities and research centres. He/she will be supervised by the research director through frequent meetings, and will receive feedbacks on his/her intermediate results during regular meetings with the Doctorate board and scientific conferences. The candidate will be involved in some teaching and communication activities, which are seen as a major opportunity to practice with dissemination of own and other relevant research results. He/she will be offered a

desk and PC at the DIG building.
The Food Sustainability Lab research projects that are related to the PhD research topics include PNRR's Agritech center and Food Sustainability Observatory initiatives (https://www.osservatori.net/it_it/osservatori/food-sustainability). The research group cooperates with several academic groups and research centres, and various public, private and non-profit stakeholders, such as the Dunning Centre for International Business network, CIRAD Montpellier, Laurier Centre for Sustainable Food Systems at the Wilfrid Laurier University in Waterloo, Canada; the National Research Institute on Agronomy (INRA); Cardiff University; Wageningen University, Roskilde University, Fondazione Banco Alimentare, the Milan Urban Food Policy Pact network.

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Decreto Direttoriale Avviso:
Avviso è il Bando, nel vostro caso D. D. 3138 del 12/16/2021 rettificato con D.D. 3175 del 18/12/2021 Avviso pubblico per presentazione Proposte di intervento per il Potenziamento di strutture di ricerca e creazione di campioni nazionali" di R&S su alcune Key Enabling Technologies da finanziare nell'ambito del Piano Nazionale di Ripresa e Resilienza, Missione 4 Componente 2 Investimento 1.4 Potenziamento strutture di ricerca e creazione di campioni nazionali di R&S su alcune Key Enabling Technologies finanziato dall'Unione europea - NextGenerationEU

Decreto di concessione: D.D. 1032 del 17/06/2022