



# PhD in INGEGNERIA GESTIONALE / MANAGEMENT ENGINEERING - 39th cycle

## PARTENARIATO PNRR Research Field: GREEN LOGISTICS SOLUTIONS AND PRACTICES FOR SUSTAINABLE FOOD SUPPLY 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 topic of environmental sustainability is gaining increasing attention in the food industry. In this regard, logistics is a key process to successfully establish green strategies. Sustainable solutions mainly regard network design (e.g., optimizing the network of warehouses with the aim to achieve environmental goals), transport (e.g., optimizing the routes, employing greener vehicles), warehousing (e.g., adopting solar panels or, broadly, solutions that makes the warehouse greener), and logistics innovation (4.0 paradigm). Although several initiatives have been launched, there is still much to be done, and further research on the topic is needed to identify and share good practices. Especially the downstream distribution of food products plays a significant role in the environmental performance of food supply chains; a crucial branch is the urban logistics, since it significantly affects the sustainability of cities. The increase in eCommerce sales poses new challenges for urban logistics, due to the growing number of last mile deliveries. Today the focus is often only on economic sustainability, but it is fundamental to explore new solutions and define guidelines intended to assure also environmental sustainability. Extant literature has identified different logistics solutions that can be employed in an urban context to improve the urban distribution, in terms of efficiency, service level and environmental sustainability. For the sake of illustration, among the emerging innovations: refrigerated parcel lockers,



	<p>alternative vehicles (e.g., cargo bikes) and the introduction of digital solutions (e.g., platforms as virtual markets for local agricultural products). However, further research efforts are needed. In this regard, it should also be considered that there are different typologies of food products that can be distributed in an urban environment, and have peculiarities (e.g., e-grocery prepared meals). Given these premises, the objective of the PhD is to investigate green logistics practices and solutions, and to develop quantitative models to assess the expected impact of the most promising solutions, with particular attention on the urban distribution.</p> <p>The scholarship is funded by a PNRR grant (ONFOODS - Research and innovation network on food and nutrition Sustainability, Safety and Security - Partenariato Esteso Tema 10 "Modelli per una alimentazione sostenibile").</p>
<p><b>Methods and techniques that will be developed and used to carry out the research</b></p>	<p>After reviewing scientific and grey literature, the PhD candidate will conduct the research by the means of multiple methods. The candidate will search for cases (with technological providers and/or logistics service providers and/or companies operating in the food industry) to analyse green logistics practices already implemented (or that could be implemented in the future) in the food supply chain (in Italy and abroad). Primary data coming from the interaction with companies will be enriched with information from secondary sources (as an example, companies' websites, industry reports). Once collected the information, the main sustainable solutions will be first classified and analysed. Focusing on the most promising ones, their impact will be evaluated by means of quantitative assessment models (e.g., by means of analytical models, simulation, ...). The candidate will thus model the implementation of some innovative logistics solutions to improve the environmental sustainability along the supply chain and the local distribution. Both economic and environmental perspective should be considered, in order to assure the applicability in real contexts of the proposed solutions. Guidelines for the implementation of the green practices will be derived from the evidences of the research project.</p>



<b>Educational objectives</b>	<p>The main educational objectives of the research project are:</p> <p>1 - to develop the capability to analyze complex systems, with reference to logistics processes in the food industry;</p> <p>2 - to build the capacity to develop models to compare (from an environmental and an economic perspective) different logistics solutions in the food industry, using both qualitative and quantitative methodologies;</p> <p>3 - to become able to interact with public and private stakeholders for research purposes and policy definitions. The candidate will then develop advanced competences and research skills according to the objectives of the project.</p> <p>The candidate will also learn methods and tools to design and conduct a research project, following the appropriate methodologies for data collection and analysis, and to present and publish results in both scientific and practitioners' contexts (e.g., scientific conferences, academic journals, practitioner conferences).</p>
<b>Job opportunities</b>	<p>The main opportunities for a PhD graduate in this research area are:</p> <ul style="list-style-type: none"> <li>- Academic career in the field of Logistics;</li> <li>- Career in logistics operators;</li> <li>- Career in food companies and retailers;</li> <li>- Career in Advisory;</li> <li>- Career in Public sector agencies, international organizations and authorities working on the policy design for sustainable innovation / sustainable logistics / sustainable mobility in cities.</li> </ul>
<b>Composition of the research group</b>	<p>2 Full Professors 6 Associated Professors 3 Assistant Professors 6 PhD Students</p>
<b>Name of the research directors</b>	A. Tumino, R. Mangiaracina, C. Siragusa

<b>Contacts</b>
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<b>Additional support - Financial aid per PhD student per year (gross amount)</b>
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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
<p>The PhD candidate will have the opportunity to attend courses and seminars on management engineering, research methodologies and skills, sustainable innovation and food sustainability at Politecnico di Milano. 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. He/she will have the opportunity to attend scientific conferences. The candidate will be eventually involved in some teaching and communication activities, which are seen as a major opportunity to practice with dissemination of research results. He/she will be offered a desk near the office of the research directors and other PhD candidates, to facilitate also informal interaction.</p>