



PhD in INGEGNERIA GESTIONALE / MANAGEMENT ENGINEERING - 39th cycle

**PNRR 118 TDA Research Field: LEVERAGING DIGITALIZATION TO ENHANCE
SUSTAINABILITY IN LOGISTICS AND OPERATIONS MANAGEMENT**

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 purpose of this Ph.D. is to investigate and analyze the potential benefits and challenges of integrating digitalization into logistics and operations management to support sustainability initiatives. On one hand, adopting sustainable practices has become imperative across industries. On the other hand, the rapid advancements in digital technologies can offer new opportunities to optimize processes, reduce their environmental impacts, and enhance their overall efficiency. For illustration purposes, digital technologies can (i) enable the integration of various stages of the supply chain, (ii) enhance visibility by providing real-time tracking and monitoring, (iii) allow the optimization of transport in logistics, or (iv) enable smart warehousing and inventory solutions, all of which impact costs and emissions. While some studies in the existing literature have explored the integration of digitalization and environmental sustainability, a significant research gap persists in understanding how digital technologies can be effectively employed to support sustainability initiatives in logistics and operations management. In more detail, the research objectives could be as follows: first, to identify the key digitalization technologies and practices - relevant to the logistics and operations management field - that can contribute to achieving sustainability goals. Second, to assess the environmental and economic impacts of these solutions (e.g., employing assessment models). Third, to explore the barriers and challenges faced by



	<p>organizations in adopting these digital practices. Ultimately, the aim is to propose practical recommendations and guidelines for companies seeking to implement digital solutions to enhance environmental sustainability.</p> <p>By gaining a comprehensive understanding of the potential benefits, challenges, and impacts of digitalization supporting sustainability in logistics and operations management, this Ph.D. is expected to provide valuable insights to industry practitioners, policymakers, and academics. Ultimately, it will contribute to a more sustainable and efficient future for industries from the logistics and operations management perspectives.</p>
<p>Methods and techniques that will be developed and used to carry out the research</p>	<p>The following methods and techniques will be developed and employed to reach the objectives of the Ph.D.:</p> <p>(i) Literature Review: A comprehensive review of the existing literature will be conducted to gain insights into current research on digitalization, sustainability, and their intersection in the realm of logistics and operations management. This review will provide the basis for identifying research gaps and formulating research questions.</p> <p>(ii) Case Studies: Multiple case studies will be undertaken across diverse industries and organizations to examine real-world applications of digitalization strategies within logistics and operations. These case studies will offer valuable empirical data and practical insights for the integration of sustainability-oriented digitalization.</p> <p>(iii) Surveys and/or Interviews: Surveys and/or interviews will be conducted with industry experts, managers, and stakeholders to gather qualitative and quantitative data concerning challenges faced, and experiences related to digitalization for sustainability within logistics and operations.</p> <p>(iv) Model Development: Assessment models will be developed to evaluate the potential impact of digitalization strategies on sustainability metrics in logistics and operations.</p>
<p>Educational objectives</p>	<p>The main educational objectives of the Ph.D. are as follows:</p>



	<p>1. to gain a comprehensive understanding of existing literature, theories, and practices within the scope of the research project's field;</p> <p>2. to develop the capability to analyze complex systems, particularly in relation to logistics and operations processes;</p> <p>3. to build the capability to develop models to compare (from an environmental and an economic perspective) different logistics solutions, using both qualitative and quantitative methodologies;</p> <p>4. to become able to interact with both public and private stakeholders for research purposes and policy formulation.</p> <p>The candidate will subsequently develop advanced expertise and research skills aligned with the project's objectives. The candidate will also learn methods and tools to design and conduct a research project, encompassing appropriate methodologies for data collection and analysis. Moreover, the candidate will acquire the ability to present and publish results in both scientific and practitioner contexts (e.g., academic journals, scientific conferences, practitioner-oriented conferences and events).</p>
Job opportunities	<p>The main opportunities for a Ph.D. graduate in this research area are:</p> <ul style="list-style-type: none"> - Academic career in the field of Logistics and Operations management; - Career in logistics providers; - Career in Consultancy; - Career in the Public sector (e.g., agencies, international organizations, and authorities working on the policy design for sustainable innovation / sustainable logistics / sustainable operations).
Composition of the research group	<p>2 Full Professors 6 Associated Professors 3 Assistant Professors 6 PhD Students</p>
Name of the research directors	C. Colicchia, A. Portioli, A. Tumino

Contacts	
claudia.colicchia@polimi.it; alberto.portioli@polimi.it; angela.tumino@polimi.it	



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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

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	
By number of months at the company	0
Institution or company where the candidate will spend the period abroad (name and brief description)	
By number of months abroad	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>The Ph.D. candidate will have the opportunity to attend courses and seminars on management engineering, research methodologies and skills, sustainable innovation, logistics management, and operations management at Politecnico di Milano. He/she will be supervised by the research director through frequent meetings and will receive feedback on his/her intermediate results during regular meetings with the Doctorate board. He/she will have the opportunity to attend scientific conferences. Over time, the candidate will be involved in some teaching and communication activities, which are seen as a major opportunity to practice with the dissemination of research results. He/she will be offered a desk near the office of the research directors and other Ph.D. candidates, fostering informal interaction.</p>