



# PhD in INGEGNERIA GESTIONALE / MANAGEMENT ENGINEERING - 38th cycle

## PARTENARIATO PNRR Research Field: SYNCHRONIZATION OF LOGISTICS ACTIVITIES UNDER UNCERTAINTY

### 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

Supply chains are involved in a crucial challenge towards the achievement of efficient, fast and resilient logistics distribution systems. The synchronization of transportation and warehousing processes at the single supply chain nodes, and synchronization among nodes can bring rapidity and reactivity. The achievement of synchronization is becoming more and more difficult due to the uncertainty on both demand and supply side. The innovations offered by Industry 4.0 paradigm regarding both physical and digital automation (e.g. solutions to collect and analyze data, such as IoT in combination with GPS sensors and artificial intelligence, or robotized systems) could enable the integration throughout nodes of logistics networks and the development of new integrated planning and controlling methods. In this way, the management of logistics systems can move from off-line and static to dynamic and real-time data-driven approaches. Data availability also opens room for discussing how to deal with uncertainty. For instance by elaborating real-time information, predicting performance and model input data can improve the quality and reactivity of decision-making considering how the environment dynamically changes, and it can avoid proactive approaches to face uncertainty that might perform worst in uncertain contexts.

To date, the academic literature has mainly focused on the technological perspective and on single activity of the whole logistics process. The PhD research project has a



	<p>twofold aim. First, to understand how the new technologies can enable the development of new logistics models and managerial approaches to support synchronized logistics systems. Second, the objective is to develop and validate new methodologies and tools to support the design and management of new synchronized logistics systems and the related benefits.</p>
<p><b>Methods and techniques that will be developed and used to carry out the research</b></p>	<p>The thesis will require an initial phase of literature review and exploratory case studies on the new technologies available to innovate traditional logistics systems and practices. The second phase will involve the development of new models and managerial approaches for logistics systems, and then methodologies and tools to support the design, management and control of such systems. Tools can involve qualitative frameworks, as well as analytical and simulation models, possibly using the digital twin approach. Collaborative projects with companies are planned.</p>
<p><b>Educational objectives</b></p>	<p>The PhD student is supposed to become a researcher with a specific capability to design and manage logistics system. The PhD student should become able to:</p> <ul style="list-style-type: none"> <li>• Understand the promises of new technologies applied to the synchronization of logistics activities from a scientific perspective and in terms of industrial applicability;</li> <li>• Identify and analyze the new synchronized logistics models;</li> </ul> <p>Develop new methodologies and tools to support the design and management of new synchronized logistics systems.</p>
<p><b>Job opportunities</b></p>	<p>Logistics engineer in logistics facilities Logistics director Logistics manager in logistics services providers and shippers</p>
<p><b>Composition of the research group</b></p>	<p>1 Full Professors 1 Associated Professors 1 Assistant Professors 0 PhD Students</p>
<p><b>Name of the research directors</b></p>	<p>Prof. Marco Melacini</p>



Contacts
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marco.melacini@polimi.it 02 2399 4059
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Additional support - Financial aid per PhD student per year (gross amount)	
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Housing - Foreign Students	--
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Housing - Out-of-town residents (more than 80Km out of Milano)	--
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Scholarship Increase for a period abroad	
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Amount monthly	725.0 €
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By number of months	6
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Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
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There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.

Computer and desk availability of individual use.

CUP: D43C22001410007

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. 1033 del 17/06/2022