



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

**THEMATIC Research Field: LOGISTICS 4.0 FOR A SUSTAINABLE SUPPLY CHAIN**

**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 increasing attention on the sustainability leads to significant challenges faced by logistics. Stakeholders ask for the adoption of practices, more and more pointed towards the social and environmental impacts. However, nowadays the initiatives and the efforts devoted to the social and environmental sustainability by companies are not sufficiently developed to address such issues.

Technological developments related to the Industry 4.0 paradigm, whose implementation to logistics is called Logistics 4.0, are paving the way to work on all the sustainability pillars, i.e. economy, society and environment. Logistics 4.0 entails both digital and physical automation systems. These solutions make available big dataset with accurate information. For instance, in the case of transportation, sensors installed on trucks allow tracking the truck position, fuel consumption and gas emissions, similarly to the amount of data gathered from sensors installed on forklifts and infrastructures. The capabilities of big data analysis become fundamental to actively work towards sustainability.

The main component of logistics is human resources, whether considering intralogistics or transportation activities. In this regard, Logistics 4.0 solutions can contribute to improve workers' condition by reducing both the physical and psychological stress. Such improvements can also lead to redesign the competencies required by logistics workers, similarly to what happened in the manufacturing context.

The research project aims at analyzing the role of



	<p>Logistics 4.0 in the transition toward a better social sustainability of logistics. Specific objectives of the project include:</p> <ul style="list-style-type: none"> <li>•Identifying a sample of best-case companies leveraging the Logistics 4.0 solutions;</li> <li>•Studying the transformation of logistics processes in light of the implementation of Logistics 4.0 solutions and related impact on human factors (e.g. physical and psychological stress);</li> <li>•Offering operational models and policies supporting the development of working environment more and more human centered.</li> </ul>
<b>Methods and techniques that will be developed and used to carry out the research</b>	<p>The initial phase of the research will encompass a literature review and exploratory case studies/interviews on the use of 4.0 solutions to improve sustainability. The second phase will entail the development of models and managerial approaches for introduction of human centered logistics 4.0 solutions. Tools can include qualitative frameworks as well as analytical models. Collaborative projects with companies are planned with the main aim of getting big data sets, getting in touch not only with managers but also with blue collars and validating the proposed models/approaches.</p>
<b>Educational objectives</b>	<p>The PhD student is supposed to become a researcher with a specific capability to design human-centered solutions for logistics system. The PhD student should become able to:</p> <ul style="list-style-type: none"> <li>•Understand main technologies/solutions of Logistics 4.0;</li> <li>•Identify and analyze the process implementation;</li> <li>•Develop new methodologies and tools to support the design and management of logistics systems with the aim of improving the social impact</li> </ul>
<b>Job opportunities</b>	<p>Logistics engineer in logistics facilities.</p>



	Logistics manager in logistics services providers and shippers.
<b>Composition of the research group</b>	1 Full Professors 2 Associated Professors 1 Assistant Professors 1 PhD Students
<b>Name of the research directors</b>	Elena Tappia

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

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	725.0 €
<b>By number of months</b>	6

<b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b>
<p>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.</p> <p>Computer and desk availability of individual use.</p>