



PhD in INGEGNERIA GESTIONALE / MANAGEMENT ENGINEERING - 40th cycle

THEMATIC Research Field: THE ROLE OF LOGISTICS IN THE CIRCULAR ECONOMY

Monthly net income of PhDscholarship (max 36 months)
€ 1500.0
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	<p>Circular economy is an important concept in achieving sustainability as it decouples economic growth from resource consumption. The context in which modern companies operate calls for a transition from the traditional concept of the linear economy, which implies the principle of "take-make-use-dispose", to the concept of circular economy, which instead implies to maximise recovery and regeneration keeping materials in closed loops. Along with the benefits, to implement circular models yield to an increased complexity for logistics processes as it involves implementing product return management and ensuring value recovery so that secondary/second-grade materials can be used as input for "new" users. Moreover, an additional aspect which increase complexity is related to the different features of backward flow compared to the traditional one. As it can be the end users who can decide whether returns products and determine the quality of returning products, the backward flows can be characterized by higher variability and they can be less predictable. In this transition, companies may face a number of challenges such as: designing the backward logistics, eventually exploiting synergies with the forward or traditional logistics; designing the required processes such as sortation and repairing, eventually rethinking the role of logistics facilities; implementing IoT systems and digital solutions for the traceability of materials; and using automated solutions for warehousing activities for seeking efficiency, taking into account the backward flow in the</p>



	<p>sales and operations planning. In the scientific literature, extant contributions have recently started including the operations perspective by proposing, for instance, optimization models to address logistics decisions such as the warehouse location problem, or focusing either on specific industries (e.g. construction) or on specific impacts (e.g. environmental impact or waste reduction). A lot of issues related to the implications of designing and managing backward flows either at the operational and tactical levels are still underexamined.</p> <p>The aims of the PhD research project are: to understand how logistics can play a role in the deployment of the concept of circular economy in companies to couple with the above-mentioned challenges; second, to develop and validate new models and tools to support the design and management of logistics processes supporting circular economies.</p>
<p>Methods and techniques that will be developed and used to carry out the research</p>	<p>The thesis will require an initial phase of literature review and exploratory case studies on the role of logistics to support circular systems and practices. The second phase will involve the development of new models and tools to improve the efficiency and the sustainability of logistics models supporting circularity. Tools can involve qualitative frameworks, empirical analysis, as well as optimization and simulation models. Collaborative projects with companies may be planned.</p>
<p>Educational objectives</p>	<p>The PhD student is supposed to become a researcher with a specific capability to design and manage logistics systems.</p> <p>The PhD student should become able to:</p> <ul style="list-style-type: none"> • Develop new methodologies and tools to support the design and management of logistics systems supporting circular systems; • Understand the role of technologies in building efficient and sustainable logistics systems supporting circular systems; • Identify new logistics paradigms supporting circular systems.



Job opportunities	<ul style="list-style-type: none"> •Logistics engineer in logistics facilities; •Logistics director; •Logistics manager in logistics services providers and shippers.
Composition of the research group	1 Full Professors 1 Associated Professors 0 Assistant Professors 0 PhD Students
Name of the research directors	Marco Melacini

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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	750.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>Educational activities, Teaching assistantship, Computer availability, Desk availability.</p> <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> <p>•Involvement in projects: "For the overall development of their capabilities, PhD candidates will work on sinergical projects to favour empirical data collection and network development for their career. Projects will give candidates the opportunity to work in group (peers and other senior professors)".</p>



- Teaching and tutoring: "If coherent with the development of their doctoral program, the PhD candidate will have the opportunity to be involved in: teaching activities, tutoring to master students, tutoring to PhD candidates for administrative processes".

Funding for educational activities: 6.100,00 Euros for three years.