



PhD in INGEGNERIA GESTIONALE / MANAGEMENT ENGINEERING - 39th cycle

Number of scholarship offered	2
Department	DIPARTIMENTO DI INGEGNERIA GESTIONALE

Description of the PhD Programme
<p>The Ph.D. programme in Management Engineering (DRIG) offers students advanced training and orientation towards research in the field of management, economics and industrial engineering. It aims to develop professionals able to carry out high-profile research in these fields in universities and international research institutions, manufacturing and service companies, regulatory authorities and other public bodies. The programme allows the student to develop a sound methodological background, multidisciplinary knowledge by attending courses designed to provide a multiplicity of visions, theories and approaches, a broad cultural panorama and the ability to study problems in an innovative manner, combining various analysis perspectives. The commitment of the Department of Management, Economics and Industrial Engineering (DIG) in the field of research and scientific cooperation with other academic institutions and major industrial and service companies offers an ideal environment for students to acquire leading-edge knowledge and cultivate their own research interests in a broad spectrum of research subjects. Research topics of the PhD Programme are aligned with the Research Areas of the Department:</p> <ul style="list-style-type: none"> •The Management Research Area is concerned with the study of management and innovation in companies, financial institutions and Public Administrations from a strategic and organizational point of view; •Researchers in the area of Applied Economics make use of economic theory and models to study problems arising in the industrial, international, financial, innovation and entrepreneurship domains. Investigations into these realms are conducted at multiple levels of analysis, including firms, industries, countries, individuals, public administrations and non-profit organizations. •The Industrial Engineering Research Area addresses the strategies, methodologies and techniques for planning, design, modelling, construction, operation, maintenance, processing and disposal of industrial plants, infrastructures and production systems of goods and services. The knowledge developed within the three Research Areas is also used in a cross-disciplinary manner, under temporary Research Lines, in order to address significant emerging issues and challenges. More detailed descriptions - in terms of issues addressed, disciplinary research fields and methodology used - are available at https://www.som.polimi.it/en/research/.



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OPEN SUBJECT Research Field: BUSINESS MODELS FOR SUSTAINABILITY IN THE FASHION SUPPLY CHAIN: INNOVATIVE PATTERNS AND ECONOMIC VIABILITY

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	<p>Fashion represents an important industry for the Italian economy. Many Italian companies could achieve over the years a worldwide reputation with global operating brands in the garment and cosmetics sectors. However, during the last years, the fashion industry has been experiencing-around the globe-an unprecedented pressure due to their business models and supply chains, which are rather centered around consumption.</p> <p>Traditional practices in the fashion industry are based on linear business models ending with the disposal of products at the end of their lifecycles. Due to increasingly conscious customers about environmental issues, e.g. climate change, and more demanding regulations with respect to sustainability development goals, fashion companies have to adapt towards more sustainable business models. However, the transition to more sustainable business models, also called business models for sustainability (BMFS), e.g., by means of closed-loop based business models is not easy, as companies have to adjust their technologies, processes, and more importantly the current logic according to which they have been doing business. Furthermore, the new developed business models may be more sustainable but not economic. In a nutshell, companies in the fashion supply chain need support to innovate their business models toward more sustainable and circular models. In addition, they need instruments to evaluate at earlier stages, whether business models for sustainability are economically</p>



	<p>viable. In this way, it is possible to better foster business models for sustainability in the fashion supply chain. To address the challenges of the companies in the fashion industry, this research project aims to answer the following main research questions:</p> <ol style="list-style-type: none"> 1. What are the state-of-the-art Business model patterns for sustainability along the supply chain in the fashion supply chain? 2. How do best practice companies adapt their activity systems and supply chains to integrate more sustainability elements into their business models? 3. How are new digitalization technologies leveraged in order to support new sustainable business models in the fashion supply chain? 4. How could the economic viability of business models for sustainability in the fashion supply chain be assessed?
<p>Methods and techniques that will be developed and used to carry out the research</p>	<p>To provide an answer to the research questions, the following methodologies are adequate:</p> <ul style="list-style-type: none"> - Literature Review on sustainable business models and supply chains with a specific focus on the fashion industry - Desk research in order to identify business models for sustainability in the fashion supply chain -Interview study with Italian/European companies that could accommodate successful business models for sustainability in the fashion supply chain -Conceptual development through pattern recognition and modeling of innovative sustainable patterns by means of System Dynamics (SD) and SD-based method development -Case study development/action research for method validation and simulation
<p>Educational objectives</p>	<p>The Ph.D. candidate at the end of the program will possess adequate research skills in the field of sustainable supply chain management and business models and specific knowledge in the fashion industry. In particular, the Ph.D, candidate will:</p> <ul style="list-style-type: none"> - be able to perform a structured literature review - be able to perform qualitative research methods - be able to analyse qualitative data to develop insights and methods/tools



	<ul style="list-style-type: none"> - be able to elaborate System Dynamics (SD) Models and conduct SD simulation studies - be able to present and publish her/his research results
Job opportunities	Academia, international institutions, construction companies, multinational organizations, consulting firms.
Composition of the research group	0 Full Professors 2 Associated Professors 1 Assistant Professors 1 PhD Students
Name of the research directors	Nizar Abdelkafi and Margherita Pero

Contacts
Nizar.abdelkafi@polimi.it; Margherita.pero@polimi.it

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

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Funding for educational activities: 5.900,00 Euros for three years. Teaching assistantship: 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. Desk availability: shared use Computer availability: individual use



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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>Methods and techniques that will be developed and used to carry out the research</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>



<p>Educational objectives</p>	<p>The main educational objectives of the research project are:</p> <ol style="list-style-type: none"> 1 - to develop the capability to analyze complex systems, with reference to logistics processes in the food industry; 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; 3 - to become able to interact with public and private stakeholders for research purposes and policy definitions. <p>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>
<p>Job opportunities</p>	<p>The main opportunities for a PhD graduate in this research area are:</p> <ul style="list-style-type: none"> - Academic career in the field of Logistics; - Career in logistics operators; - Career in food companies and retailers; - Career in Advisory; - Career in Public sector agencies, international organizations and authorities working on the policy design for sustainable innovation / sustainable logistics / sustainable mobility in cities.
<p>Composition of the research group</p>	<p>2 Full Professors 6 Associated Professors 3 Assistant Professors 6 PhD Students</p>
<p>Name of the research directors</p>	<p>A. Tumino, R. Mangiaracina, C. Siragusa</p>

<p style="text-align: center;">Contacts</p>	
<p>angela.tumino@polimi.it</p>	

<p style="text-align: center;">Additional support - Financial aid per PhD student per year (gross amount)</p>
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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

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.