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Supervisor Expression of Interest MSCA-IF Marie Sklodowska Curie Action-Individual Fellowship 2019

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Department Name: Research topic: (https://www.polimi.it/en/scientific-research/research-at-the-politecnico/departments/)	Department of Management, Economics and Industrial Engineering Industrial Engineering: SH1_10 Management; marketing; organisational behaviour; operations management SH1_11 Technological change, innovation, research & development SH2_6 Sustainability sciences, environment and resources
MSCA-IF Research Area Panels	<input type="checkbox"/> CHE_Chemistry <input type="checkbox"/> ECO_Economic Sciences <input checked="" type="checkbox"/> ENG_Information Science and Engineering <input type="checkbox"/> ENV_Environmental and Geosciences <input type="checkbox"/> LIF_Life Sciences <input type="checkbox"/> MAT_Mathematics <input type="checkbox"/> PHY_Physics <input type="checkbox"/> SOC_Social Sciences and Humanities
Politecnico di Milano Areas:	<input type="checkbox"/> Cultural Heritage <input type="checkbox"/> Smart Cities <input type="checkbox"/> Territorial Fragilities <input type="checkbox"/> Health <input checked="" type="checkbox"/> Industry 4.0
Brief description of the Department and Research Group (including URL if applicable):	The Department of Management, Economics and Industrial Engineering (DIG) of Politecnico di Milano was established in 1990 as the Department of Economy and Production (DEP). The Department's main objective is research, which is pursued through collaborations with leading Italian and international schools and institutions. Alongside research, the Department focuses on education. The Department of Management, Economics and Industrial Engineering, with MIP Politecnico di Milano Graduate School of Business, is part of



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	<p>the School of Management of Politecnico di Milano (SoM).</p> <p>SoM research draws from three main expertise disciplinary domains:</p> <ul style="list-style-type: none">• Management, which is concerned with the study of management and innovation of companies, financial institutions, Public Administrations and non-profit organizations from a strategic and organizational point of view and with a particular emphasis on the interplay between strategy, management and the use of technology.• Applied Economics, which applies economic theory and models to issues in the industrial, international, financial, innovation and entrepreneurship domains. The subjects analysed can be individuals, companies, non-profit organisations, public administrations, industries and countries.• Industrial Engineering, which addresses the strategies, methodologies and techniques used in planning, designing, modelling, constructing and operating industrial plants, infrastructures and production systems concerned with goods and services, and in the maintenance, processing and disposal of these systems. <p>www.som.polimi.it</p> <p>The research group is working on the research line tackling the “Challenges in Supply Chain Management” (https://www.som.polimi.it/en/research/research-lines/#supplychain)</p> <p>It is composed by prof. Andrea Sianesi, prof. Roberto Cigolini, prof. Alessandro Brun, prof. Margherita Pero, Federica Ciccullo, Hakan Karaosman, Jinou Xu. The research group has developed over the years strong expertise in the area of supply chain management, alignment of supply chain management and new product development, sustainability, and fashion and luxury industries.</p>
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<p>Brief project description: (max 1 page)</p>	<p>Aligning product development and Supply Chain Management for the Circular Economy: An investigation of the Textile, Leather and Consumer Electronics Supply Chains</p> <p>Today’s current focus on mass production and consumption resulted in extreme human influence on natural processes that, in turn, influences climate change. Environmental and ethical stewardships are needed to tackle climate change; however, globally dispersed and fragmented manufacturing networks and lack of industrial collaborations prevent such actions.</p> <p>Circular economy (CE), in this vein, appears to be a promising economic paradigm, focusing on disruptive innovation, greener industrial capacities and policy interventions. According to the European Commission, CE based transitions could result in 600 billion euros annual gains for the European manufacturing sector (Korhonen et al., 2018). It is</p>
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therefore pivotal to explore how traditional industries, which are dependent upon natural resources, could be transformed. Personal goods, such as apparel, leather goods and consumer electronics, are good candidates for this transformation. In fact, the global fashion industry, that is one of the most labour-intensive industries, is built on globally dispersed supply networks that generate a significant impact on both the environment and societies. Waste emerges to be a big problem, that is, 35% of the material input ends up being waste at fashion supply chains while only 1% of materials used to produce clothing is actually recycled into new clothing (Ellen MacArthur Foundation, 2017). As for consumer electronics, the wastes generated by these products are huge: for instance, in the U.S. the cumulative number of obsolete computers is expected to exceed 300 million, but, in 2012, only 29% of the e-waste was recycled.

Putting in practice CE means design new, or re-design existing, supply chains in these industries. Indeed, the supply chain perspective on CE appears to be fundamental to implement it, given the key role of “upstream” actors to provide recycled inputs (Masi et al., 2017) and of “downstream” actors (i.e. customers) to be part of the “regenerative” flows.

Nevertheless, it is not only the supply chain of a product that has to undergo profound modifications, but also product design and development has to be innovated. However, this requires designers and supply chain actors to jointly develop and share resources. Global yet very competitive business environments are called out to reallocate regenerative resources to create competitive advantage. Hence, there is a knowledge gap to uncover on i) *what types of actions are needed to engage designers and supply chain actors to develop and produce new products for CE*; ii) *what kind of technical and relational capabilities are needed to accelerate this transition across industries*. The research project aim is therefore to investigate these research gaps, providing a scientific and practical contribution to support global economy in moving towards CE.

For instance, among the technical capabilities, in particular, a key role might be played by the shared adoption of some quantitative tools to assess the impact of the different choices, connected the application of CE, on the environment and on key SCM processes. These assessments are connected with the use of materials, thus comparing the traditional linear cycle with the regenerative cycle triggered by the application of CE. On the one hand, implementing CE is a way to reduce the pressure exerted on the use of natural resources, on the other hand some recycling process are considered to be energy-intensive or implying a logistics complexity that would lead to a further environmental impact connected to transportation. The quantitative estimation, for example through Life Cycle Assessment (LCA), of such complex impact on the environmental dimension of sustainability is an uncovered yet interesting area of research.