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DIPARTIMENTO DI
INGEGNERIA GESTIONALE

DIG PhD scholarship

Title	**Artificial Intelligence in Supply Chain Design and Management**
Theme	Many problems encountered in Supply Chain Design and Management have to be addressed with a quantitative approach and require large volumes of data for feeding optimization algorithms. For instance, the definition of optimal manufacturing and distribution nodes' capacity and location and optimal inventories' size and management are typical supply chain problems that require the implementation of quantitative methods. Today, new challenges are facing Supply Chain Design and Management. First, as sensors are getting more deployed in logistics channels, manufacturing sites, and retailer stores, and as cloud platforms are being increasingly leveraged to connect companies and increase visibility along the supply chain, the need to explore different optimization approaches and to develop new decision support systems increases considerably. Second, these changes are associated with a profound evolution in employees skills and expectations, which are generating unprecedented dynamics in the job market, leaving companies short of stable expertise and involvement by their employees. Finally, the instability triggered by several disruptions in the world's economy (from the pandemic to the war in Ukraine) is posing unprecedented challenges to traditional methods (e.g., forecasting tools and just-in-time manufacturing) and demands for brand new approaches. This PhD thesis will therefore focus on complex Supply Chain Design and Management decisions due to this trend, considering opportunities (more data from sensors and systems) and threats (workers and market instability). The research will explore methodologies belonging to the field of AI and machine learning that are more suitable for this environment, namely those connected with iterative exploration and dynamic adaptation capabilities such as reinforcement learning and online learning methodologies, to delevop new tools for companies to excel in Supply Chain design and management. The research will leverage interdisciplinary skills, thus involving researchers with a strong background in computer science and supply chain management, and will be grounded in close partnerships with companies that make their problems and datasets available to this research.
DIG professors involved	Giovanni Miragliotta, Margherita Pero, Nizar Abdelkafi
International collaborations	Skema Business School (France)