POLITECNICO DI MILANO

PhD in INGEGNERIA GESTIONALE / MANAGEMENT ENGINEERING - 41st cycle

THEMATIC Research Field: OPEX-AI: LEVERAGING ARTIFICIAL INTELLIGENCE TO ENHANCE OPERATIONAL EXCELLENCE

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	Artificial intelligence has been touted as the next game-changer for the industry. Companies are widely attempting to introduce AI in their processes, searching for the chimera of productivity disruption that the hype on AI is leading to. However, AI applications are mainly related to solving operational issues and developing technical solutions, which is good, but they are only a part of the journey that is composed of other, more managerial aspects, such as leadership and methodologies necessary to achieve improvement and innovation. Grounded in the disciplines of Continuous Improvement and Operational Excellence, this research focuses on investigating the contribution of Gen-AI in the management of innovation and improvement of processes. The study claims to advance academic knowledge in both the fields of operational excellence and AI application for operations. In the former research fields, the study will frame the cognitive functions for the continuous improvement discipline, providing a necessary foundation for structuring the activities that AI can perform. In the latter research field, the research will explore the potential of AI in leading a continuous improvement journey, which activity performs, and what role human interaction plays in the success of the continuous improvement journey when AI is introduced. The impact for practitioners would be many: a better understanding of the potential uses of AI and the factors that affect the value of that potential is significant

	knowledge for managers to lead AI transformation in their operations.
Methods and techniques that will be developed and used to carry out the research	The methodologies adopted in the research include a literature review, case study development, and experiments in an experimental setting.A literature review is necessary to understand the state of the art of the implementation of AI for improving and innovating processes.The case study will support the exploration of new uses of AI in the operations that are not traced by literature and to develop a framework to define cognitive activities carry-out during a OPEX project.Experiments will test the capability of Gen-AI in supporting the different activities of OPEX project. The experiments will be done in “laboratory” exploiting the database of OPEX projects of the research group.
Educational objectives	The educational objectives of the PhD candidate are different.First, there is the development of knowledge related to the research fields touched by the research: operational excellence and AI. The candidate will become an expert in operational excellence, particularly in the methodologies and leadership practices that govern the operational excellence journey. The candidate will learn to assess the setting of continuous improvement practices in an organisation and to evaluate pro and cons of the setting. About AI, the candidate will distinguish the different AI techniques presents in industry and will learn to create Gen-AI agents specific for OPEX activities. Second, the candidate will develop capabilities in research methodologies (mentioned before) that will create a background of forma mentis that candidate will exploit in the future career.Third, during the journey, the candidate is expected to support teaching and tutoring activities of the group, so the candidate will develop organizational capabilities and soft skills (such as leadership) to manage interaction with the students.
Job opportunities	The job opportunities generated by the PhD are several.First, the research will lead the candidate to be a valuable prospect for an academic career. The journey is expected to generate 4 papers on international journals at

	least Q1 level for Scimago ranking (the reasonable target journals for this research are IJPR, PPC, JMTM). Second, the candidate will have several easy entrance gates, even for the industry, because of the two main values developed during the PhD. One is that the candidate will also gain experience about industry. The research and the tutoring activities will put the candidate in strong interaction with the operations department of several companies, giving a broad view on how companies manage their operations process. Two, the candidate will develop high expertise on OPEX and AI, at the level of a top expert in the country. The immediate results in job opportunities are related to consulting about operations and supply chain transformation. However, job opportunities outside of consultancy are present too. All positions related to Lean or digital transformation within companies, as well as roles such as operations manager or supply chain department manager, are aligned with the profile of PhD.
Composition of the research group	1 Full Professors 1 Associated Professors 4 Assistant Professors 6 PhD Students
Name of the research directors	Alberto Portioli

Contacts
alberto.portioli@polimi.it; matteo.rossini@polimi.it

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents	--

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
The PhD candidate will have access to a comprehensive educational and research environment. They will participate in doctoral-level courses on operations management, sustainable

manufacturing systems, data analysis, and qualitative research methods. Educational activities will be complemented by seminars and workshops organized within the School, the research group and through international networksThe candidate may also take part in teaching assistantship activities, supporting master's courses in Industrial and Innovation Management, thereby strengthening their pedagogical skills.The research group has two shared offices, where desks are available and are shared. In addition, departmental open-space areas are available, where desks can be booked when needed.If required, the candidate may use their allocated research funds to purchase a personal laptop suitable for their research activities.A regular on-site presence of at least three days per week is required to ensure integration within the research group, active collaboration, and participation in academic activities. The vacation periods generally include three weeks in August and one week during the Christmas holidays and are agreed upon with the PhD supervisor. The research will be carried out in close collaboration with industrial and academic partners, offering opportunities for joint projects, participation in international conferences, and research visits abroad.

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 groups (peers and other senior professors).

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.