POLITECNICO DI MILANO

PhD in INGEGNERIA GESTIONALE / MANAGEMENT ENGINEERING - 38th cycle

Number of scholarship offered	14
Department	DIPARTIMENTO DI INGEGNERIA GESTIONALE

Description of the PhD Programme

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:

- 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/.
Selected candidates are enrolled with the basic departmental scholarships, and the specific research subject will be assigned, with the agreement of the candidate and the Board of Professors of the PhD Programme, within the first months of the PhD activity. For specific research topics, further increments can be defined by the proposing research group (see the additional subject forms in the following pages describing the topics and the scholarships offered for each topic). Please refer to the call for further information.

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THEMATIC Research Field: DESIGN TO VALUE UNVEILING HIDDEN APPLICATIONS IN EXISTING/EMERGING TECHNOLOGIES

Monthly net income of PhDscholarship (max 36 months)
€ 1400.0 In case of a change of the welfare rates or of changes of the scholarship minimum amount from the Ministry of University and Reasearch, during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	Studies of innovation management have often focused their investigations on two domains: technologies and markets. Technological innovation has been capturing most attention, especially as far as radical technological change is concerned. Indeed, in the past decades a rich stream of studies has explored the antecedents of technological breakthrough. Later, investigations have focused more on the applications of existing or new technologies and/or products to penetrate into new markets domains. However, design has recently gained much attention among practitioners and scholars as a source of innovation. Firms are increasingly investing in design and involving design firms in their innovation processes. Academic journals are publishing articles that explore the contribution of design to product development and business performance. And the practitioners' press has dived into the subject extensively. Still, the role of design in innovation and competition remains a rather young (preparadigmatic) area, with blurred boundaries and often unclear or contrasting perspectives. Design is related to the innovation of the meaning of products and services: it concerns the purpose, the 'why' people uses things, rather then the functionality and performance of products (i.e. the 'what' and 'how').Short sighted companies often focus on the search of new markets for a technology without taking in consideration its meanings. In this way when companies look for potential applications they just focus on technological substitutions: companies

	add more effective and powerful functionality or improve performance, leaving the existing meaning untouched. The myopic part of the industry embraces the new technology for utilitarian reasons - until a firm invests on design driven-innovation, finds out the disruptive quiet meaning and realizes its full potential. Especially in technology-intensive companies, design has got a minor role: in this companies design is eventually useful for creating a user friendly interface, thus making technology more accessible, and for wrapping the technology core in a nice box, but nothing more. Instead, design can play a major role at a technology's inception, especially when a breakthrough technology arises. When a breakthrough technology emerges, it embeds many potential meanings. Some are immediate and promoted by those who have initially guided technological development. Other meanings are quiescent, but sooner or later they become manifest. More precisely each technology is considered to embed a set of disruptive new meanings that are waiting to be uncovered. If a company reveals those quiescent meanings it will seize the technology's full value, celebrating a technology epiphany.
Methods and techniques that will be developed and used to carry out the research	The research project will be developed in Fedrigoni (https://fedrigoni.com/); Fedrigoni is a leading player in specialty papers (for packaging, quality prints, security and fine arts) and self-adhesive solutions. Today Fedrigoni is the third global player in self-adhesive materials and the European leader in specialty papers. Fedrigoni is currently engaged in a deep review of its product portfolio, aiming not only at completing and improving the product range but also at identifying market opportunities in adjacent businesses. An example of this is the 'plastic to paper' transition, where "unconventional applications" of paper properties have been leveraged to replace plastic materials. Fedrigoni has developed in the last years several research collaborations with the Alta Scuola Politecnica (ASP), creating the appropriate settings to welcome a PhD research project. The research project will rely on three main research methodologies: - Case Study Research, aimed at investigating the

	required capabilities and practices in the development of Technology Epiphanies; - Ethnographic Research, aimed at observing the development process of Technology Epiphanies; - Action Research, aimed at experimenting the contribution of Technologies Epiphanies in valuing the portfolio of existing/emerging technologies.
Educational objectives	Industrial PhD candidate will develop competences and attitudes aimed at applying Technology Epiphanies practices in dealing with existing/emerging technologies: - Analyzing the potential of existing/emerging technologies; - Identifying original application field where to adopt existing/emerging technologies; - Harmonizing the portfolio of existing/emerging technologies with the aim of optimizing the product portfolio.
Job opportunities	- R&D Manager in Industrial and High-Tech Manufacturers - Product Manager and Business Developer Industrial and High-Tech Manufacturers - Procurement Manager in Industrial and High-Tech Manufacturers
Composition of the research group	2 Full Professors 1 Associated Professors 3 Assistant Professors 5 PhD Students
Name of the research directors	Claudio Dell'Era e Stefano Magistretti

Contacts
Claudio Dell'Era (claudio.dellera@polimi.it) Stefano Magistretti (stefano.magistretti@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	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Funding for educational activities: 5.700,00 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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THEMATIC Research Field: OPEN SYSTEM ARCHITECTURES, PROJECT ORGANIZING AND THE INDUSTRIAL DYNAMICS OF THE NEW SPACE ECONOMY

Monthly net income of PhDscholarship (max 36 months)
€ 1400.0 In case of a change of the welfare rates or of changes of the scholarship minimum amount from the Ministry of University and Reasearch,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 strategic use of modularization and standardization of system design along with co-innovation and open innovation practices are radically changing complex project businesses. This transition is one of the key enablers of the New Space Economy. The concept of Open system Architectures is enabling a large variety of missions, while assuring compatibility with a wide range of launchers, by customizing the same tech platform. The benefits of Open system Architectures include reducing manufacturing time and costs, enanching reusability of HW and SW modules, and creating additional revenue streams along the system life cycle. How to address the new opportunities and challenges in the governance and management of such complex projects and programmes is still largely unknown and underinvestigated.
Methods and techniques that will be developed and used to carry out the research	The candidate will develop her/his research in tight collaboration with a leading European company in the Space Industry and research partners involved in the joint research initiative. The research project will leverage the literature on system engineering and value creation in complex projects. The research approach will mixed qualitative and quantitative methods, such as case study methodology and economic and financial assessment of capital investments.
Educational objectives	

	The research is multidisciplinary in nature: the candidate will develop advanced research skills in the areas of complex projects and programme management, system engineering, and business model innovation. She/he will learn how to design and conduct a research project, adopting the proper methodologies for data collection and analysis, and to present and publish results in both academic and practictioner outlets.
Job opportunities	The successful completion of the programme will open several job opportunities in both academia and companies, in research, consulting and managerial roles.
Composition of the research group	4 Full Professors 0 Associated Professors 2 Assistant Professors 0 PhD Students
Name of the research directors	Proff. Paolo Trucco and Giorgio Locatelli

Contacts
paolo.trucco@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	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Funding for educational activities: 5.700,00 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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THEMATIC Research Field: OPERATIONS IMPROVEMENT AND DIGITALISATION

Monthly net income of PhDscholarship (max 36 months)
€ 1400.0 In case of a change of the welfare rates or of changes of the scholarship minimum amount from the Ministry of University and Reasearch,during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	In the last years, industrial production systems are being transformed due to a higher level of digitalisation, which leads to intelligent and connected solutions. Digitalisation is affecting a bigger and bigger part of daily operations of manufacturing and service companies whilst it has not affected in the same way the improvement process, where activities are almost entirely performed by human being. The research aims, thus, to define frameworks and tools to: - Better undertand the improvement/problem solving process - Identify possible ways to structure such process - Identify possible digital solutions to support humans in carrying out the structured problem solving process
Methods and techniques that will be developed and used to carry out the research	The following methodologies will be applied in the research project: - Literature analysis in order to map the situation of research at international level; - Case studies, in order to analyse the best practices of problem solving and innovation management of companies that have already develop new good practices; - Action research projects to work on tools for data analysis in order to empower human's ability to analise data and find the root causes of the problems
Educational objectives	The main educational objectives of the research project are the followings:

	- Understand how digitalisation can support the problem solving and innovation management processes - Developing frameworks and tools to facilitate the development and adoption of digital tools to improve problem solving approach. - Evaluating the impact of digital tools on improving the problem solving capabilities of humans.
Job opportunities	The opportunities for a PhD graduate in this research area are: - Academic career in the fields of industrial, automation department and operations department; - Industrial career: - in a consulting company; - in the OPEX area of manufacturing and service companies
Composition of the research group	1 Full Professors 0 Associated Professors 2 Assistant Professors 0 PhD Students
Name of the research directors	Alberto Portioli (POLIMI) Victor Gomez Frias (UPM)

Contacts
Alberto Portioli Staudacher Alberto.portioli@polimi.it, +39 02 2399 2733 Victor Gomez Frias victor.gomez.frias@upm.es

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	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
The candidate will work at the Department of Management, Economics and Industrial Engineering and UPM and attend the PhD Courses and all the educational activities of the PhD Program in

both the institutions.
Increase in the scholarship for stays abroad:
Euro 700,00 per month, for up to 6 + 6 months

Funding for educational activities: 5.700,00 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