

COFUND AGOTI AERRASTI

PROPOSED TOPIC FOR PHD *

ICT based multiplant production design and management for the Footprint optimization

DOCTORATE PROGRAMME *

Engineering for the Information Society and Sustainable Development

SCIENTIST IN CHARGE *

Dr. Aitor Goti from University of Deusto (<https://es.linkedin.com/in/aitor-goti-elordi-50513944>)

HOST RESEARCH UNIT *

This project will be developed at the Deusto Digital Industry Chair of the Faculty of Engineering of the University of Deusto. The area of digital manufacturing is priority for the University (see <https://www.deusto.es/cs/Satellite/deustoresearch/en/home/interdisciplinary-research-platforms-1/industry-40-0?cambioidioma=si> for further details). The faculty of Engineering is positioned in top positions in the area of ICTs (see <https://ingenieria.deusto.es/cs/Satellite/ingenieria/en/facultad-ingenieria?cambioidioma=si> for more details). The push of the digital transformation has pushed the creation of the Digital industry Chair to cover the current and future needs of the society (see details in <https://www.deusto.es/cs/Satellite/deusto/en/university-deusto/deusto-a-unique-student-experience/the-new-deusto-chair-digital-industry-presents-its-team-to-tackle-toptlevel-industrial-challenges-/noticia>).

CANDIDATES PROFILE *

The following skills are needed:

Hard working.

Technologically talented.

Clear in written Communication.

Curious.

Keen on Public Speaking.

Clever in Project Management.

Positive but with Critical Thinking.

Ready for Collaboration.

SCIENTIFIC RESEARCH AREAS *

Chemistry (CHE)

Social Sciences and Humanities (SOC)

Economic Sciences (ECO)

Information Sciences and Engineering (ENG)

Environmental Sciences and Geology (ENV)

Life Sciences (LIF)

Mathematics (MAT)

Physics (PHY)

DESCRIPTION OF THE RESEARCH PROPOSAL *

Multinational and also SMEs that are facing an internationalization process are obliged to follow their global Customers and Suppliers markets and rethink their industrial footprint (i.e. new production sites abroad, reconfiguration of the current multi-plant network,..)

The area of Operations (product development, purchasing, production and supply chain) within the total Value Chain of the Company has to face these challenges, where new methods of design and management to adapt their production network are needed.

Sustainability is gaining widespread acceptance even in top management, but both the literature and the market is lacking of tools for designing and managing multi-plant production environments for the maximization of sustainability [1]. Thus, this research continues the line opened in [1] to develop new tools for multinationals and SMEs so that they respond to the need of the joint business and sustainability maximization the society and the planet are formulating.

EXCELLENCE OF THE HOST RESEARCH UNIT

5 main academic publications related to the PhD research topic proposal *

1. Goti, A.; de la Calle, A.; Gil, M.; Errasti, A.; Bom, P.; García-Bringas, P. Development and Application of an Assessment Complement for Production System Audits Based on Data Quality, IT Infrastructure, and Sustainability. *Sustainability* 2018, 10, 4679, doi:10.3390/su10124679. IMPACT FACTOR JCR: 2.592.
2. Global Production Networks; Errasti, A., Ed.; CRC Press, 2016; ISBN 9780429100352. SECOND EDITION (FIRST 2013).
3. Martínez, S.; Errasti, A.; Rudberg, M. Adapting Zara's 'Pronto Moda' to a value brand retailer. *Prod. Plan. Control* 2015, 26, 723–737, doi:10.1080/09537287.2014.971526. IMPACT FACTOR JCR: 1.532.
4. Mediavilla, M.; Errasti, A.; Mendibil, K. Framework for assessing the strategic plant role and deploying an improvement roadmap in global operations networks: an empirical study. *Prod. Plan. Control* 2015, 26, 799–823, doi:10.1080/09537287.2014.990067. IMPACT FACTOR JCR: 1.532.
5. Bom, P.; Goti, A. Public Capital and the Labor Income Share. *Sustainability* 2018, 10, 3895, doi:10.3390/su10113895. IMPACT FACTOR JCR: 2.592.

Main projects developed by the scientist in charge/host research unit of the proposed topic for PhD *

AVAILAFACTURING: Development of a tool for the management of Technical Assistance Service Networks for the availability maximisation of Manufacturing Equipment and/or Products (European transnational project MANUNET-2009-BC-006).

SERVISTOCK: Development of a tool for the joint optimization of logistic safety stock levels and transportation types (European transnational project MANUNET-2008-BC-001).

EFFECTIWORK: Integrated ICT-based solution for enhanced manufacturing efficiency and safety
MANUNET-2010-804 (European transnational project MANUNET-2009-BC-006).

PTQ-12-05653 Torres Quevedo reseach project - Development and implementation of the industrial management model: Natra Production & Quality System 2016.

BIGOP-DATA Modelo de Big Data para el diseño y la mejora de sistemas productivos y logísticos, Universidad Empresa 2016-17 call of the Basque Government, Department of Education).

Direction of the PhD Thesis of Dr. Sandra Martinez, validated through several relevant publicacions (see e.g. the one authored by Sandra and mentioned above)

Direction of the PhD Thesis of Dr. Miguel Mediavilla, validated through several relevant publicacions (see e.g. the one authored by Miguel and mentioned above)

INTERDISCIPLINARY COLLABORATION

Identification of the different knowledge areas that the proposed topic for PhD integrates or aims to integrate *

Sustainability

Operations and manufacturing strategy for multiplant networks

Industry 4.0. for Operations management

Reengineering and Improvement programs to deploy strategies

Is co-direction of the thesis envisaged? *

Yes, Dr. Ander Errasti from Natra (<https://www.linkedin.com/in/ander-errasti-opacua-48816242/?originalSubdomain=es>) will co-direct the thesis.

Describe how interdisciplinarity is planned to be achieved and implemented *

The project will apply research methodologies in Operations combining a) exploratory Case Study Research, b) Action Research and c) a Delphi panel. In the three methologies multi-disciplinary personnel and experts will take part, ensuring the requested inter-disciplinary.

As well, the research unit proposed (Director and co-director, along with tutor) has both academic and practical industrial experience. E.g. in academic terms, Aitor Goti has 11 JCR articles sorted in the research domain of Social Sciences (and 25 overally). Regarding top management positions, both Aitor Goti and Ander Errasti have expertise in the areas of Engineering and Economic Science (see profiles for further details).

INTERNATIONAL COLLABORATION

Relationship of the proposed topic for PhD with H2020 priorities, SDGs and/or other relevant policies related to the topic *

The current research team does not have neither MSCA nor ERC projects active. Nevertheless, thanks to the positive results obtained in the last years, we expect to at least propose an ERC consolidator grant proposal.

The footprint concept is fully aligned with the 17 SDGs. If a most important one has to be defined, "Goal 12: Responsible Consumption and Production" could be the one to remark. In this case, the concept of Total material footprint would be tackled. The total material footprint is the sum of the material footprint for biomass, fossil fuels, metal ores and non-metal ores.

The proposed topic is as well closely related to the strategies formulated first in H2020 and then in Horizon Europe, and due to the increasing importance of Sustainability and the management of footprint (see e.g. <https://etipwind.eu/news/eu-institutions-reach-agreement-on-horizon-europe/>).

Is international co-direction or international "co-tutelle" envisaged? *

A "co-tutelle" with Donatella Corti from SUPSI- University of applied sciences and arts of Southern Switzerland is envisaged.

Ms Corti has already collaborated with the Directors of the thesis when she was at the Politecnico Di Milano, with relevant results, e.g.:

1. Errasti, A.; Rudberg, M.; Corti, D. Managing international operations: configuration of production network for SMEs. *Prod. Plan. Control* 2015, 26, 691–692, doi:10.1080/09537287.2014.971506.
2. Martínez, S.; Corti, D.; Errasti, A. The Ramp-Up Process. In *Global Production Networks*; CRC Press, 2013; pp. 249–266.

Additional relevant activities are expected from this new collaboration.

INTERSECTORAL COLLABORATION

Identification of possible relevant external stakeholders to collaborate with in the framework of the proposed topic for PhD *

The basque clusters of a) Automotion (ACICAE, <https://www.acicae.es/>), b) Logistics (MLC ITS Euskadi, <http://www.mlcluster.com/>) and c) Food (Clúster de alimentación de Euskadi, <http://www.clusteralimentacion.com/en>) are usual collaborators in projects developed by Ander Errasti and Aitor Goti, and will continue disseminating their actions. E.g. the three clusters collaborated in the dissemination of BIG-OP Data of Aitor Goti (for example see the full session of the cluster of logistics in https://issuu.com/monicafanlo2/docs/deusto_20-_20calle_goti_20-

_20udeus). Similarly, both ACICAE and MLC ITS promoted a session where Ander Errasti was one of the experts presenting.

Is industrial doctorate envisaged? *

Yes, the Natra group (visit <https://natra.com/en/> for further details) will co-fund the industrial doctorate. Natra has already collaborated with the University of Deusto in other related activities cofunding them, such as the BIG-OP DATA project mentioned above.

IMPACT

Contribution of the proposed topic for PhD to the knowledge field beyond the scientific impact, identifying the opportunities for adoption, uptake and exploitation of the foreseen results by the relevant stakeholders, and indicating how the dissemination and diffusion of results to the target group(s) will be done *

The alignment with the Smart Specialization Strategy of the Basque Country (RIS3) is natural, as it considers the Smart Manufacturing a top priority. More specifically, within the Smart Manufacturing this project is encompassed in the multi-sectorial and the transportation boxes, as it focuses on the Footprint. As well, a special emphasis will be given to the food sector (niche for the RIS3 of the Basque Country). For that, it is worth mentioning that Natra is a food company with a plant in Oñate, where the work developed will be tested for validation.

INNOVATION

Description of the innovative aspects of the hosting offer *

New tools (methods, packs) for the multiplant production design and management for the Footprint optimization will be developed. The tools will have the flexibility to adapt themselves to the ICTs available to each company.

INCLUSION

How will the proposed topic for PhD integrate the inclusion dimension? *

The research will attack this dimension from the widest point of view of the Sustainability, as it was tackle on Goti et al. (2018) "Development and Application of an Assessment Complement for Production System Audits Based on Data Quality, IT Infrastructure, and Sustainability". First, data quality for the analysis and management of industrial operations networks will be ensured to support decision maing based on actual and trustworthy data. Second, decision making processes will have to jointly consider the 17 SDGs. Within this support for decision making for the 17 SDGs a special emphasis will be given to footprint, so the inclusion dimension will be properly covered.

ADDITIONAL INFORMATION