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Special Issue: Engineering Digital Transformation

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1. Introduction

This special issue of the Journal of Industrial Engineering and Management is dedicated on the most recent and relevant research, theories and practices in Industrial Engineering and Operations Management presented at the 11th International Conference on Industrial Engineering and Industrial Management and XXI Congreso de Ingeniería de Organización - CIO 17.

The CIO'17 was held on 5th and 6th July 2017 in Valencia and was organized by the Universitat Politècnica de València (UPV) and the Asociación para el Desarrollo de la Ingeniería de Organización (ADINGOR) and with the collaboration of the Centro de Investigación en Gestión e Ingeniería de Producción (CIGIP) and the Reengineering Operations GroupWork Logistics Excellence (ROGLE).

222 authors from 11 countries contributed a total of 113 communications, which were presented in oral presentations, posters, doctoral symposiums and workshops. 14 of the best communications were selected to be published in this special issue.

We gratefully acknowledge the authors and particularly the reviewers, whose valuable comments have improved the quality of the selected papers, which were extended (and again reviewed by pairs) after the conference in order to be published in this Special Issue.

2. Overview of the Papers

The papers chosen for this special issue were selected for their quality and their scientific rigor. They embody the multidisciplinary character of the conference as well as its international vocation. The topics are diverse, but all refer to problems related to the CIO's scope. Specifically, the paper **Company maturity models: Application to supplier development program in oil&gas sector** by Jabier Retegi Albisua and Juan Ignacio Igartua Lopez. It presents the process followed in order to implement a supplier development program in a refinery using a company maturity model (CoMM). The application in three real cases of a CoMM created for the specific needs of a supplier development program of an Oil&Gas company are presented.

Two papers deal with continuous improvement, staff participation and cultural change in organizations. The first one, **Promoting structured participation for competitiveness in services companies**, which is presented by Jesús García-Arca, José Carlos Prado-Prado, and Arturo J. Fernández-González, aims to identify the main drivers that facilitate the successful deployment of a participation program focused on improve competitiveness. The second paper, **A model to align the organizational culture to Lean** was presented by Mehrsa Taherimashhadi and Imma Ribas and proposes an evaluation model that help organizations to determine cultural misalignments between the corporate culture and the lean culture before its implementation and gives some managerial recommendations to correct them. Also, related to the lean approach, the paper **An ANP-based network to measure the impact of Lean production on organisational performance** by José Luis Ruano Pérez, Raúl

Rodríguez-Rodríguez, Juan-José Alfaro-Saiz and María-José Verdecho. The paper suggests the usage of the Analytic Network Process as the tool to effectively link the implementation of LP techniques and organisational performance.

Three papers were selected in the transportation and logistics field. The first one, **Economic and environmental packaging sustainability: A case study** by Iván González-Boubeta, Mar Fernández Vázquez-Noguerol, Pablo Domínguez-Caamaño, and José Carlos Prado Prado, describes the strategy of a Spanish agro-food company to improve sustainability of their packaging choices. From a totally different perspective the second paper, **Identification of reverse logistics decision types from mathematical models** by Pascual Cortés Pellicer and Faustino Alarcón Valero, discusses managerial decisions related to reverse logistics and presents several mathematical models to support decision making in the field. The third paper, **Best practices in road transport: An exploratory study** by Mar Fernández Vázquez-Noguerol, Iván González-Boubeta, Pablo Domínguez-Caamaño and José Carlos Prado-Prado, identifies the best practices developed and evaluated based on empirical data captured through a survey addressed to logistics and transport activities professionals.

The next paper, **Transfer prices assignment with integrated production and marketing optimization models**, presented by Enrique Parra, describes different transfer prices computation methods to coordinate actions of the bussines units in decentralized organizations.

Two of the selected articles focus on the field of knowledge management. The first one, **Knowledge management as a tool for improving business processes: An action research approach** was proposed by Aurora Martínez-Martínez, Luis Manuel Cerdá Suárez, Roberto Sánchez Montero and Eva Asensio del Arco, presents a case study underlining the relevance of knowledge management in the particular case of a museum. The second paper, **The knowledge absorptive capacity to improve the cooperation and innovation in the firm** by Lourdes Sáiz Barcena, David Pérez-Miguel and Miguel Ángel Manzanedo del Campo, studies the absorptive capacity types in the knowledge management literature and aims to understand how companies can strength their contexts of cooperation in order to innovate.

CIO also encourages contributions on emergent topics. This is the case of the two next papers in this special issue. The first one, **Analyzing the effects of applying IoT to a metal-mechanical company** by Eduardo Cañizares and Faustino Alarcón Valero, shows the improvements obtained through the application of IoT in a company of the metal-mechanical sector. The next one contribution, **Software defined networking firewall for Industry 4.0 manufacturing systems** by Akihiro Tsuchiya, Francisco Fraile, Angel Ortiz, and Raúl Poler, addresses the Industry 4.0 paradigm. Authors explain that Industry 4.0 manufacturing systems require industrial devices to be connected to the network. Potentially, this can increase the risk of cyberattacks. This contribution presents a novel software defined networking (SDN) firewall that automatically applies standards architecture without compromising network flexibility.

In the CIO conference there is room for all the fields in which industrial engineering tools can be used. The paper **Efficient election campaign optimization using integer programming** by Evren Güney aims to provide a mathematical framework for political parties to optimize their election campaigns.

And finally, the last paper is about engineering education, a relevant topic that cannot miss in the CIO. **Formative assessment framework proposal for transversal competencies: Application to analysis and problem-solving competence** by Pedro Gómez-Gasquet, Mª José Verdecho, Raúl Rodriguez-Rodriguez and Juan José Alfaro-Saiz.