



# CIO 2019

*13th International Conference on Industrial Engineering and Industrial Management  
 XXIII Congreso en Ingeniería en Organización*

ORGANIZATIONAL ENGINEERING IN INDUSTRY 4.0

11<sup>th</sup> – 12<sup>th</sup> July, 2019

[www.cio2019.org/en/](http://www.cio2019.org/en/)



## Organizers



## Collaborators



## Sponsors



## Welcome

Dear Conference Participants and Colleagues,

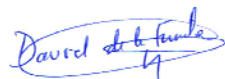
It is an honour to present the Programme of the '13th International Conference on Industrial Engineering and Industrial Management and XXIII Congreso en Ingeniería en Organización - CIO 2019'.

CIO 2019 is organized by the Organizational Engineering Group (GIO) of University of Oviedo, and hosted by ADINGOR, the leading Spanish association dedicated to the development and dissemination of knowledge related to Engineering and Business Organizations (management sciences, social and economic issues, quantitative methods, statistical, and computer applications) in order to improve management processes.

CIO 2019 conference motto is: "Organizational Engineering in Industry 4.0". The conference aim is to give an opportunity for researchers, experts, practitioners and other interested participants to exchange experiences on the most recent and relevant research, theories and practices in Industrial Engineering, Management and Operations. New solutions for innovative plants, research results and case studies considering advances in maintenance and production from Industry 4.0 point of view will be presented and discussed, paying special attention to application of intelligent systems, methods and tools in production, maintenance, logistic, quality management, information systems, product development, etc. The mission of the Conference is to promote links between researchers and practitioners from different branches, to enhance an interdisciplinary perspective of industrial engineering and management. It will be a conference of very high standards, built on the experience of previous editions of CIO conferences.

We want to thank the Institutional Supporters, Sponsors and Collaborator firms. We gratefully acknowledge the Authors, Invited Speakers and especially the Reviewers. We must also recognize the great effort of the different Committees (Scientific, Conference, Workshops, Doctoral Symposium and Editorial).

We are sure that CIO2019 Conference will be an unique opportunity for networking and enjoying a high quality scientific programme. Furthermore, it will be a great opportunity to discover the lively coastal city of Gijón in Asturias.



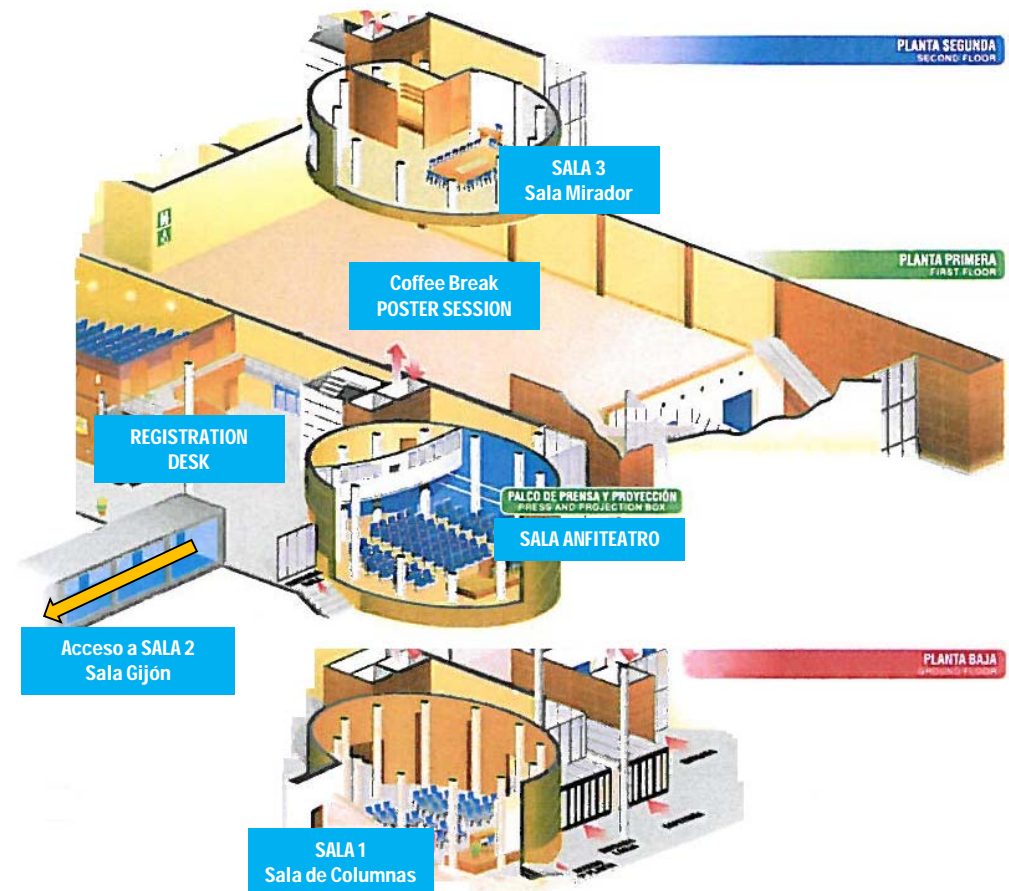
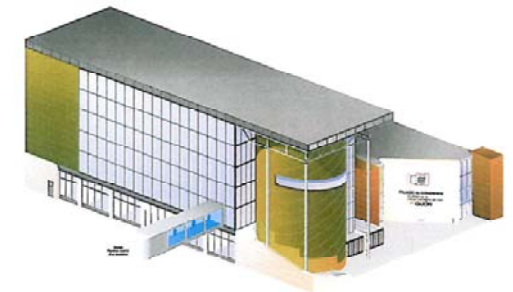
David de la Fuente García  
CIO2019 Conference Chair



Raúl Pino Diez  
CIO2019 Conference Chair

## Venue

CIO 2019 will be held in the Palacio de Congresos, at Recinto Ferial Luis Adaro – Paseo Doctor Fleming 481, 33203 Gijón, Asturias (Spain).



## General Information

### Wi-Fi Access



PalacioCongresos Wi-Fi network is available.

PASSWORD: **palac10f1dma**

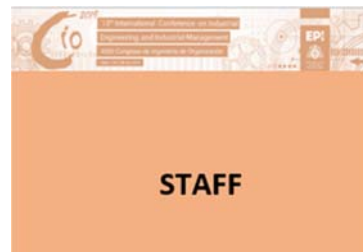
Need help? Ask our Staff.

### USB with files

All the CIO2019 full papers are saved in the USB memory that you have received with your personal documentation.

### Staff and Information

Students with STAFF identification will give you all the required support at the Registration Desk



## Lunch

Thursday, July 11th at 13:30 – 15:00



CARLING GOAL Bar Deportivo Restaurante  
Av. del Molinón, 14, 33203 Gijón



HAT TRICK Bar Deportivo, Restaurante  
Avenida del Molinón, 33203 Gijón

Friday, July 12th at 14:00 – 15:00

Traditional Asturias lunch at El Tendaydu del Muséu del Pueblu d'Asturies, Paseo Doctor Fleming, 877



Lunch tickets will be provided in your personal documentation.

## Certificates

You will receive your electronic Certificates of the CIO2019 in your inbox at the e-mail address used in your registration

## General Programme

Thursday, July 11th	
TIME	ACTIVITY
9:00 - 10:00	<b>Registration</b>
10:00 - 10:30	<b>Conference Opening (Sala Anfiteatro)</b>
10:30 - 12:00	<b>Parallel Sessions</b>
12:00 - 12:30	<b>Poster Session / Coffee Break</b>
12:30 - 13:30	<b>Plenary Session 1 (Sala Anfiteatro)</b>
13:30 - 15:00	<b>Lunch Time (Hat Trick / Carling Goal)</b>
15:00 - 16:30	<b>Parallel Sessions</b>
16:30 - 17:00	<b>Plenary Session 2 (Sala Anfiteatro)</b>
17:00 - 17:30	<b>Coffee Break / ADINGOR Assembly (Sala Anfiteatro)</b>
18:00 - 20:15	<b>Walking City Tour</b>
21:00 - 23:30	<b>Gala Dinner (ABBA Hotel)</b>

Friday, July 12th	
TIME	ACTIVITY
9:00 - 11:00	<b>Parallel Sessions</b>
11:00 - 11:45	<b>Poster Session / Coffee Break</b>
11:45 - 13:45	<b>Parallel Sessions</b>
13:45 - 14:00	<b>Conference Closing (Sala Anfiteatro)</b>
14:00 - 15:00	<b>Closing Lunch (El Tendayu)</b>

## Social Events

### Real Club de Golf de Castiello

Wednesday, July 10th 9:00 – 14:00

ADINGOR has reserved, on the day prior to the Conference, on July 10th, two golf games in the Real Club de Golf de Castiello for all who are interested.



### Walking City Tour

Thursday, July 11th 17:45 – 20:15

A bus will pick up the conference attendants at the main door of the Recinto Ferial Luis Adaro at 17:45, and will take them to the Asturias Railway Museum. After the visit to this museum, the bus will take them to the starting point of the Walking City Tour



Starting from the Town Hall square, the City tour will head to the ancient (although remodelled) fishing neighbourhood of Cimadevilla. Located on a peninsula, it offers archaeological remains from the Roman Empire times and monuments such as the baroque Revillagigedo Palace (s. XVIII) –today Internacional Center of Contemporary Art, the Collegiate Church of San Juan Bautista (St. John the Baptist) and the chapels of La Soledad (Solitude, s.XVII) or Los Remedios (The Remedies). Next to this last building the birthplace of Jovellanos, statesman, author and philosopher is situated. The building is a typically Asturian mansion dating from the 15th century, and is currently one of the Museums of Gijón.

At the top of the hill, facing the Cantabrian Sea and overlooking the city from both sides, the famous artist Eduardo Chillida chose this privileged location to place its sculpture "Eulogy of the Horizon", in 1990, being now the symbol of the city.

At the end of the Walking City Tour, the bus will take the participants back to the main hotels: Principe de Asturias, Tryp-Pelayo, NH, and ABBA Hotel. Note that the last stop of the bus is the ABBA Hotel, where CIO2019 Gala Dinner will take place.



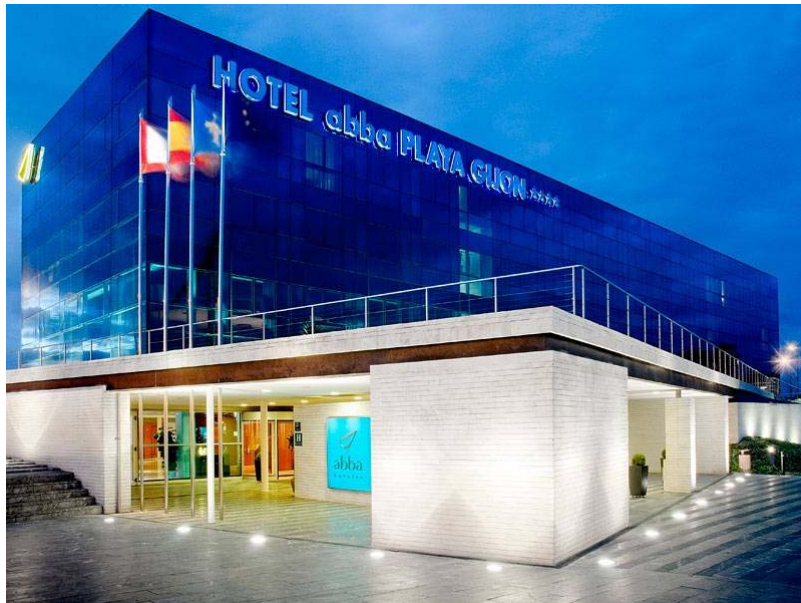
## Gala Dinner

Thursday, July 11th 21:00 – 23:30

At the end of the Walking City Tour, the bus will take the participants back to the main hotels: Principe de Asturias, Tryp-Pelayo, NH, and ABBA Hotel. Note that the last stop of the bus is the ABBA Hotel, where CIO2019 Gala Dinner will take place.

Please kindly note that those attendants who decide to get off the bus at their hotel will need to go to the gala dinner by themselves. The other hotels are relatively close to the ABBA Hotel (less than 10 min walking).

Gala dinner ticket will be provided in your personal documentation.



## Invited Speakers

### Plenary Session 1

Thursday, July 11th 12:30 – 13:30

#### Carlos Alba

Carlos Alba leads the Digital and TechnoEconomic global research programs Worldwide within Global R&D in ArcelorMittal across divisions, regions and functions.

Digital core technologies as artificial intelligence or mathematical optimization are systematically merged with ArcelorMittal value chain while we are advanced in others as internet of things or big data analytics. This includes manufacturing, procurement, commercial, supply chain, logistics, strategy and product development.

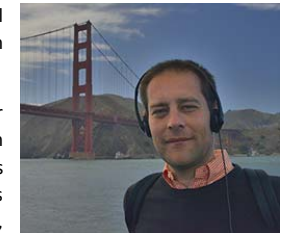
Carlos joined the ArcelorMittal Global Research & Development corporate team in 2007 focusing his activity on artificial intelligence models applied to business optimization Companywide (Europe, Americas and ACIS).

He holds a PhD Master Science Degree in Computer Science from the University of Oviedo, Spain, where in parallel he taught for the last 14 years in its Engineering Schools (Mining, Industrial, Telecommunications and Computer Science).

#### Javier Sesma

Javier Sesma is an Industrial Engineer from the Polytechnic School of Engineering of Gijón, AMP from the IE Business School, and has completed postgraduate studies at the European School of Management and Technology in Berlin (ESMT).

Javier Sesma is currently the General Director of the World Development and Innovation Research Center that thyssenKrupp elevator has at the Laboral University of Gijón in the Principality of Asturias. Located since 2007 in the creative environment of Laboral, "City of Culture", in the north of Spain (Gijón, Asturias). The center of thyssenKrupp elevator, which has been operating for 10 years, is a global reference in urban mobility and elevation systems, acceleration corridors, virtual media, artificial vision, digitalization, ecodesign and sustainability, where more than 74 patents have been reported and received important international awards in the technologies TurboTrack, iwalk, ACCEL, MULTI 1:3 or HoloLinc, some of them appear worldwide from Asturias. In September 2017, "Ambassadors of Gijón 2017" was distinguished for the work it carries out in the City of Gijón as a destination for Innovation and Business, and the promotion of the knowledge economy and the promotion of innovation from Gijón and Asturias to all world.



## Plenary Session 2

Thursday, July 11th 16:30 – 17:00

### Maria Del Mar Alemany Díaz

*ADINGOR AS ELEMENT FOR ENHANCING ACADEMIC CAREER*

María del Mar Eva Alemany Díaz is an Associate Professor in Operations Management and Operations Research at the Universitat Politècnica de València (UPV) in Spain. She is an industrial engineer and received her PhD in Industrial Engineering from the UPV. She is currently Vice Dean for Educational Innovation at the Higher Technical School of Industrial Engineers of UPV. She is a member of the Asociación para el Desarrollo de la Ingeniería de Organización (ADINGOR) and president of the Commission for the Promotion of the Academic Career of ADINGOR. She is a member of the Research Centre on Production Management and Engineering (CIGIP) and has participated in several Spanish and European Projects, leading some of them. She will talk about the current status of actions promoted by ADINGOR for enhancing academic career: strategic plan, lines of action, some preliminary results.



### Gaizka Garechana

*CHARACTERIZATION OF THE ADINGOR RESEARCH ACTIVITY*

Professor Gaizka Garechana serves at the Business Management department of the University of the Basque Country and is a member of the TFM Research Group. His research activity is focused on the analysis of science and technology, particularly in the possibilities of text mining tools for developing indicators and methodologies that could guide decision making in this field. He is going to describe the evolution of the scientific activity developed by the members of ADINGOR since the start of the association, using both conceptual and geolocated coauthorship data.



## Conference Programme

Thursday, July 11th																		
09:00 - 10:00	Registration																	
10:00 - 10:30	Conference Opening (Sala Anfiteatro)																	
10:30 - 12:00	SALA 1 Sala de Columnas				SALA 2 Sala Gijón					SALA 3 Sala Mirador								
	Doctoral Symposium				Operations Research (Eng) 1					Miscellaneous (Spa)								
	73	92	96				26	40	66	72	86		42	48	69	76	77	
12:00 - 12:30	Poster Session / Coffee Break																	
	22	27	28	29	34	36	46	49	51	52	53	54	55	56	60	62	71	74
	78	79	81	88	93	103	106	107	108	109	110	115	116					
12:30 - 13:30	Plenary Session 1 (Sala Anfiteatro)																	
13:30 - 15:00	Lunch Time (Hat Trick / Carling Goal)																	
15:00 - 16:30	SALA 1 Sala de Columnas				SALA 2 Sala Gijón					SALA 3 Sala Mirador								
	Production, Planning & Control (Eng)				Strategy (Eng)					Quality & Human Resources (Eng)								
	58	63	83	100	113		30	32	38	57			23	43	68	91	94	
16:30 - 17:00	Plenary Session 2 (Sala Anfiteatro)																	
17:00 - 17:30	Coffee Break / ADINGOR Assembly (Sala Anfiteatro)																	
18:00 - 20:15	Walking City Tour																	
21:00 - 23:30	Gala Dinner (ABBA Hotel)																	

Friday, July 12th																		
09:00 - 11:00	SALA 1 Sala de Columnas					SALA 2 Sala Gijón					SALA 3 Sala Mirador							
	Supply Chain (Eng) 1					Operations Research (Eng) 2					Education Innovation (Eng)							
	25	45	50	64		24	70	75	97	104	35	61	67	84	87	114		
11:00 - 11:45	Poster Session / Coffee Break																	
	22	27	28	29	34	36	46	49	51	52	53	54	55	56	60	62	71	74
	78	79	81	88	93	103	106	107	108	109	110	115	116					
11:45 - 13:45	SALA 1 Sala de Columnas					SALA 2 Sala Gijón					SALA 3 Sala Mirador							
	Supply Chain (Eng) 2					Operations Research (Spa)					Workshop: Sustainability in Industry 4.0 (Eng)							
	85	89	98	101	111	41	44	47	59	90	105	31	33	37	39			
13:45 - 14:00	Conference Closing (Sala Anfiteatro)																	
14:00 - 15:00	Closing Lunch (El Tendayu)																	

Thursday, July 11th 10:30 - 12:00	
<b>SALA 1 (Sala de Columnas) - Doctoral Symposium</b>	
<b>73</b>	<b>Blockchain and Smart Contracts: A Systematic Review</b> Simon Fernandez-Vazquez, Rafael Rosillo, David de la Fuente, Paolo Priore
<b>92</b>	<b>Financing infrastructure in emerging markets under public-private partnerships: managing the impact of foreign exchange on debt service</b> Juan Martinez, Rafael Rosillo, David de la Fuente, Javier Giner
<b>96</b>	<b>Modelos y algoritmos para la optimización de planes de aprovisionamiento, producción y distribución en empresas industriales y cadenas de suministro</b> Eduardo Guzmán Ortiz, Raúl Poler
<b>SALA 2 (Sala Gijón) - Operations Research 1 (Eng)</b>	
<b>26</b>	<b>European Union Air Navigation Projects: Impact on Airspace Operations Management</b> Jose Antonio Calvo Fresno, Jesús Morcillo Bellido, Beatriz Rodrigo Moya
<b>40</b>	<b>Autonomous Underwater Vehicles Inspection Management: Optimization of Field of View and Measurement Process</b> Isaac Segovia Ramirez, Pedro Jose Bernalte Sanchez, Mayorkinos Papaelias, Fausto Pedro Garcia Marquez
<b>66</b>	<b>Integrating Industry 4.0 with lean manufacturing</b> Patxi Ruiz-de-Arbulo-López, Jordi Fortuny-Santos, Itziar Luján-Blanco, Antonio Sartal
<b>72</b>	<b>Calculation of the on-hand stock levels with fuzzy techniques</b> Ester Guijarro, Eugenia Babiloni, Maria-Jose Canós-Darós, Lourdes Canós Darós, Sofia Estelles Migue!l
<b>86</b>	<b>How fast is Additive Manufacturing disrupting the Spanish manufacturing sector? Last three years' evolution</b> Luis Isasi, Jesús Morcillo, Alfonso Duran Heras
<b>SALA 3 (Sala Mirador) - Miscellaneous (Spa)</b>	
<b>42</b>	<b>Relación Universidad-Empresa: un caso real de colaboración en la Escuela Superior de Ingeniería de Sevilla</b> Alejandro Escudero-Santana, Pablo Aparicio Ruiz, Rafael Grosso-delaVega, Maria Rodriguez Palero
<b>48</b>	<b>Sector Automoción en la Comunidad Valenciana: Estrategias de Futuro</b> Sofía Estelles Migue!l, Gregorio Rius Sorolla, Marta Palmer Gato, Ester Guijarro
<b>69</b>	<b>La lealtad del cliente online en el sector de moda. Cómo mejorar las estrategias de éxito en la red</b> Adrián Castro-López, Javier Puente, Rodolfo Vazquez Casielles
<b>76</b>	<b>Metodología para el Análisis de Sensibilidad de un Algoritmo de Control Adaptativo</b> Elena Barbadilla, Pablo Aparicio Ruiz, Jose Guadix, Luis Onieva
<b>77</b>	<b>Una propuesta metodológica para el diseño de sistemas de gestión de inventarios</b> Eugenia Babiloni, Ester Guijarro, José Miguel Albarracín, Juan Ramon Traperó



**Thursday, July 11th**  
**15:00 - 16:30**

**SALA 1 (Sala de Columnas) - Production, Planning & Control (Eng)**

<b>58</b>	<b>Discrete EOQ and POQ</b> Manuel Cardós Carboneras, Lorenzo Ros McDonnell, María Victoria de la Fuente
<b>63</b>	<b>Improving through employee participation. The case of a Spanish food manufacturer</b> Iago Portela, Iván González Boubeta, José Carlos Prado Prado
<b>83</b>	<b>LONJAD: Additive Manufacturing, Scheduling and Genetic Algorithms</b> Salvador Castillo-Rivera, Juan De Antón, Ricardo Del Olmo, Javier Pajares, Adolfo López-Paredes
<b>100</b>	<b>How to identify and exploit the bottleneck in Make-to-order industries. A cross case based strategic perspective</b> Aitor Lizarralde Aiausti, Unai Apaolaza, Miguel Mediavilla
<b>113</b>	<b>Analysis of the impact of Initialization and Local Search in the Performance of the Firefly Algorithm in Solving the Flexible Job-shop Scheduling Problem</b> Nicolás Alvarez Gil, Rafael Rosillo, David de la Fuente, Raul Pino

**SALA 2 (Sala Gijón) - Strategy (Eng)**

<b>30</b>	<b>A closer look at lock-in effect and channel preference</b> Emiliano Acquila-Natale, Ángel Hernández-García, Santiago Iglesias Pradas, Julián Chaparro-Peláez
<b>32</b>	<b>Open innovation in Spanish research and technology organisations (RTOs): objectives and barriers</b> Ramon Uribe-Echeberria, Juan Ignacio Igartua, Rafael Lizarralde
<b>38</b>	<b>Integration of Uncertainty in EDM Methodology</b> Fernando Acebes, Javier Pajares, Felix Villafañez, Adolfo Lopez-Paredes
<b>57</b>	<b>Lending a hand by lending a loan: financing firms with social goals through crowdfunding platforms</b> José Manuel Fernández-Angulo, Gustavo Morales, Ylisy Núñez, Antonio Hidalgo

**SALA 3 (Sala Mirador) - Quality & Human Resources (Eng)**

<b>23</b>	<b>The adoption of the Life Cycle Assessment methodology by companies</b> Aitor Basañez Llantada, Gaizka Insunza Aranzeta, Ibon Aranburu Amiano
<b>43</b>	<b>Externalities of the Sharing Economy: effect on employment of holiday accommodation platforms. The case of Madrid</b> Gonzalo Coello-Villarino, Gustavo Morales, Ruth Carrasco-Gallego
<b>68</b>	<b>Closing Gap between New Development and Voice of Customer</b> Mercedes Grijalvo, Maria Fernanda Eliopoulos, Gustavo Morales
<b>91</b>	<b>An efficient waste to energy model for isolated environments. Case study: La Gomera</b> Manuel Uche-Soria, Carlos Monroy
<b>94</b>	<b>The effect of participation on employee well-being and organizational performance: a regional and cross-sectorial empirical study</b> Urtzi Uribetxebarria, Unai Elorza, Alaine Garmendia, Damian Madinabeitia

**Friday, July 12th**  
**09:00 - 11:00**

**SALA 1 (Sala de Columnas) - Supply Chain 1 (Eng)**

<b>25</b>	<b>Impact of Additive Manufacturing in Aerospace Industry Purchasing Process</b> Jesús Morcillo Bellido, Jon Martínez Fernández, Jesús Morcillo García
<b>45</b>	<b>Methodology for launching a packaging rationalization project. An "action research" case in the industrial sector</b> Jesus Garcia Arca, José Carlos Prado Prado, Alicia Trinidad González-Portela Garrido
<b>50</b>	<b>Lean vs. Theory of Constraints in the wider supply chain: Delving into the impact of noise</b> Julio César Puche Regaliza, Borja Ponte, José Costas Gual, Raul Pino, David de la Fuente
<b>64</b>	<b>Redesigning the picking process in e-grocery. A case in a store-based retailer</b> Mar Fernández Vázquez-Noguerol, Iván González Boubeta, Iago Portela, José Carlos Prado Prado

**SALA 2 (Sala Gijón) - Operations Research 2 (Eng)**

<b>24</b>	<b>Solving the Order Batching and Sequencing Problem with Multiple Pickers: A Grouped Genetic Algorithm</b> Jose Alejandro Cano, Pablo Cortés, Emiro Antonio Campo, Alexander Correa-Espinal
<b>70</b>	<b>An improved mathematical model for a two-agent scheduling problem in a two-machine flow shop</b> Mohammad Hasan Ahmadi darani, Rashed Sahraeian
<b>75</b>	<b>A matheuristic approach for sourcing, production, and delivery plans optimization</b> Eduardo Guzmán Ortiz, Raúl Poler
<b>97</b>	<b>A story of organizational philosophy change: a case study</b> Maria Esteller-Cucala, Vicenc Fernandez, Diego Villuendas
<b>104</b>	<b>Mandatory Convertibles and Shareholders' Incentives</b> Angel Huerga, Carlos Monroy

**SALA 3 (Sala Mirador) - Education & Innovation (Eng)**

<b>35</b>	<b>Understanding and representation of organizational training programs and their evaluation</b> Maria Ruiz, Juan Ignacio Igartua, Maitane Mindeguia, Jaione Ganzarain
<b>61</b>	<b>The importance for a Start-up to trust in Open Innovation: a systematic literature review</b> Katia Mastrostefano, Gustavo Morales, Marco Greco, Michele Grimaldi, Jose Antonio Blanco
<b>67</b>	<b>Digital social innovation network: an explorative inventory and analysis of Spanish actors</b> Laura Rodrigo, Miguel Palacios, Isabel Ortiz-Marcos
<b>84</b>	<b>Towards the Science Map on Sustainability in Higher Education</b> Jesus Santiago Alejandro de la cruz, Rosa Rio-Belver, Alejandro Rodríguez Andara, Yara Almanza
<b>87</b>	<b>Factors Influencing Disruptive Innovation Development Within Spanish Firms: A Qualitative Research</b> Sucet Martínez Vergara, Jaume Vall's Pasola
<b>114</b>	<b>Investigating the Impact of Internet of Things on the Educational Business Process</b> Omneya Kandil, Rasha Abd El Aziz, Rafael Rosillo, David de la Fuente





**Friday, July 12th**  
**11:45 - 13:45**

**SALA 1 (Sala de Columnas) - Supply Chain 2 (Eng)**

<b>85</b>	<b>Development of a methodology for the management of risk in a supply chain. Application to the pharmaceutical sector</b> Nicolás Anich, Manuel Mateo
<b>89</b>	<b>The daily odyssey of the delivery workers in pedestrianized zones</b> Juan Carlos Gomez Sanchez, María Victoria de la Fuente, Lorenzo Ros McDonnell
<b>98</b>	<b>DDMRP - The need to standardise an implementation process</b> Aitor Lizarralde Aiaitui, Alaitz Kortabarria, Aitor Orue Irasuegui
<b>101</b>	<b>Environmental Performance of an e-waste Recycling Program in Colombia: An Agent-Based Simulation Approach</b> Oscar Fabian Velasquez Rodriguez, Carlos Eduardo Moreno Mantilla, Gustavo Alfredo Bula
<b>111</b>	<b>Dependency perspective in Supply Chain Risk Assessment</b> Alina Diaz-Curbelo, Angel Gento

**SALA 2 (Sala Gijón) - Operations Research (Spa)**

<b>41</b>	<b>Estimación de flujos de entrada de vehículos al puerto de Algeciras durante el desarrollo de la Operación Paso del Estrecho basada en redes neuronales</b> Pablo Aparicio Ruiz, Jesús Portillo García-Pintos, Luis Onieva, Alejandro Escudero-Santana
<b>44</b>	<b>Predicción de rotura de tuberías en redes de abastecimiento de agua a través de un modelo de regresión logística</b> Alicia Robles Velasco, Pablo Cortés, Jesús Muñuzuri, Elena Barbadilla
<b>47</b>	<b>Secuencias Quota en taller de flujo de demanda general con programación lineal entera mixta</b> Joaquín Bautista, Rocio Alfaro-Pozo
<b>59</b>	<b>Productividad limitada por el riesgo ergonómico en líneas de montaje de modelos mixtos</b> Rocio Alfaro-Pozo, Joaquín Bautista
<b>90</b>	<b>Evaluación de los efectos en el cambio de la marea sobre la productividad de un puerto</b> Carlos Arango, Leidy Vargas, Juan Jose Bravo
<b>105</b>	<b>Proceso de diseño de una subasta combinatoria</b> Eduardo Navas, David Poza, Félix Villafañez, Javier Pajares, Adolfo Lopez-Paredes

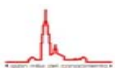
**SALA 3 (Sala Mirador) - Workshop: Sustainability in Industry 4.0 (Eng)**

<b>31</b>	<b>Are SMEs prepared for Industry 4.0?. A study of a regional group of companies in Spain</b> Juan Ignacio Igartua, Jaione Ganzarain, Dorleta Ibarra
<b>33</b>	<b>Analysis of Industrial Symbiosis Platforms for Circular Economy development</b> Carmen Jaca, John Rincon, Pablo Barrenechea, Marta Ormazabal
<b>37</b>	<b>Sustainability and Industry 4.0. A case study</b> Javier Santos, Elisabeth Viles, Andrés Muñoz-Villamizar, Paloma Grau, Jesus Pelegino
<b>39</b>	<b>Circular economy: an analysis framework</b> Jesús Morcillo, Alfonso Duran Heras

**Thursday, July 11th 12:00 - 12:30**  
**Friday, July 12th 11:00 - 11:45**

**POSTER SESSION**

<b>22</b>	<b>Metaheurísticos para ruteo del acomodo de mínimo tiempo posible para almacenes refrigerados</b> Rodrigo Gomez
<b>27</b>	<b>A Review on Strategic Decisions on Home Care Operations Management</b> Àlex Armadàs, Alberto Garcia-Villoria, Amaia Lusa
<b>28</b>	<b>How to Ensure Gender Equity through Social Sustainability in Agri-Food Supply Chains</b> Ana Esteso, Llanos Cuenca, Elena Navarro Astor, María del Mar Alemany Díaz
<b>29</b>	<b>Relationships between transformation and exploration phases of absorptive capacity: Feedback loops in low technology sectors</b> David Perez, Lourdes Sáiz Bárcena, Miguel Ángel Manzanedo del Campo
<b>34</b>	<b>Structural Complexity Mitigation in Network Design and Rationalization</b> Jesús María Pinar, Diego Ruiz-Hernández, Mozart Menezes
<b>36</b>	<b>Automatic Vehicle Collision Detection Device Adapted To Preserve Privacy Policy Standards Through a Web Communication System.</b> Jose Luis Roca Gonzalez, Juan Manuel Rojas Llamas, Alejandro López Belchí, José Serna Serrano, Manuel Caravaca Garratón
<b>46</b>	<b>Optimal design of water supply networks using a tabu search algorithm</b> Alicia Robles Velasco, Pablo Cortés, Jesús Muñuzuri, Alejandro Escudero-Santana
<b>49</b>	<b>Kahoot! as gamification teaching resource in Business Organization subjects</b> Antonio López-Arquillos, María Martínez-Rojas, M <sup>o</sup> del Carmen Pardo-Ferreira, Juan Carlos Rubio-Romero
<b>51</b>	<b>Industry 4.0 for the development of more sustainable Decision Support Tools for Agri-food Supply Chain Management</b> David Perez Perales, María-José Verdecho, Faustino Alarcón Valero
<b>52</b>	<b>Systematic Literature Review on symmetry breaking option on mathematical programming models for planning problem with rolling horizon procedures</b> Gregorio Rius Sorolla, Julien Maheut, Sofia Estelles Miguel, Jose P. Garcia-Sabater
<b>53</b>	<b>Availability of technological resources and training needs: the case of supercomputing training</b> Álvaro Fernández González, José-A. Miguel-Dávila, Camino Fernández Llamas, Miguel Ángel Conde, Vicente Matellán Olivera
<b>54</b>	<b>A Systematic Literature Review of Design Thinking in Education</b> Acebo Enrique, José-A. Miguel-Dávila, Lilianna Herrera
<b>55</b>	<b>Review of the Altman Z-Score model, as a predictor of corporate bankruptcy</b> Roberto Alcalde Delgado, Miguel Ángel Manzanedo del Campo, Lourdes Sáiz Bárcena, Ricardo del Olmo
<b>56</b>	<b>The two-stage assembly flowshop scheduling problem with buffers</b> Carlos Andrés Romano, Julien Maheut
<b>60</b>	<b>Project portfolio selection for increasing sustainability in supply chains using a multi-criteria approach</b> María-José Verdecho, David Perez Perales, Faustino Alarcón Valero
<b>62</b>	<b>Key aspects for an effective implementation of Project Based Learning: experience in engineering studies</b> Geresa Gimenez, Rodolfo De Castro
<b>71</b>	<b>Multi-period Capacitated Intermodal Network Design with Allocation of Investment Budget</b> Anny Del Mar Agamez Arias, Jose P. Garcia-Sabater, José Moyano-Fuentes
<b>74</b>	<b>Supply chain procurement and production network design</b> Imma Ribas, Amaia Lusa, Albert Corominas



Thursday, July 11th 12:00 - 12:30

Friday, July 12th 11:00 - 11:45

POSTER SESSION	
78	Emergent Approach of Occupational Health and Safety within the Servitization of Industry 4.0 Juan Antonio Torrecilla-García, M <sup>a</sup> del Carmen Pardo-Ferreira, María Martínez-Rojas, Juan Carlos Rubio-Romero
79	Framework for evaluating the effectiveness of website personalizing María Esteller-Cucala, Vicenc Fernandez, Diego Villuendas
81	Experiencia piloto de gamificación con uso de aplicaciones móviles en una asignatura de máster de Ingeniería María Rodríguez Palero, Jose Guadix, Elena Barbadilla, Alicia Robles Velasco
88	Estudios de revisión en el área de Iotificación Pilar I. Vidal-Carreras, Julio J. García-Sabater
93	A model for the strategic management of innovation and R&D at pharmaceutical firms through the analysis of clinical trials Javier Puente, Susana Alonso, Fernando Gascon, Borja Ponte, David de la Fuente
103	Un algoritmo de búsqueda voraz iterada para el problema de programación de producción de bucle cerrada en Julien Maheut, Carlos Andrés Romano, Jose P. García-Sabater
106	Modelado de un Mecanismo de Subastas Combinatorias para el Sistema Ferroviario Español Eduardo Navas, David Poza, Félix Villafañez, Javier Pajares, Adolfo Lopez-Paredes
107	Mejora de la Productividad con herramientas Lean en una empresa del sector metal-gráfico María Victoria de la Fuente, Juan Carlos Gomez Sanchez, Lorenzo Ros McDonnell, Manuel Cardós Carboneras
108	Análisis y Evaluación de la implantación de Proyectos de Business Intelligence en Pymes José Manuel González Varona, Adolfo LópezParedes, Javier Pajares, Fernando Acebes, Felix Villafañez
109	Production Optimization in 3Dprinting manufacturing factories Adolfo LópezParedes, Juan de Anton, Juan Jose Senovilla, Javier Pajares, Salvador Castillo-Rivera
110	Subastas en el mundo del acero Alberto Gomez, Borja Ena, José Parreño, Isabel Fernandez, Nazario García
115	Ecodesign practices and their impact on the results of leading industrial companies in environmental performance. An exploratory research from a qualitative perspective Naiara Uriarte, Patxi Ruiz-de-Arbulo-López, Beñat Landeta, Germán Arana
116	An EOQ model and pricing for perishable goods when the demand depends on freshness and discount rate Behnaz Gharakhani, Mahsa Ghandehari

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