



13<sup>th</sup> International Conference on Industrial  
Engineering and Industrial Management

XXIII Congreso de Ingeniería de Organización



**Organizational  
Engineering  
in Industry 4.0**

**BOOK OF ABSTRACTS**

**Gijón, 11th-12th July 2019**

## **Book of Abstracts**

**“13<sup>th</sup> International Conference on  
Industrial Engineering and  
Industrial Management” and  
“XXIII Congreso de Ingeniería de  
Organización (CIO2019)”**

**Book of Abstracts**

**“13<sup>th</sup> International Conference on  
Industrial Engineering and Industrial  
Management” and “XXIII Congreso de  
Ingeniería de Organización  
(CIO2019)”**

**COORDINADORES**

**DAVID DE LA FUENTE GARCÍA**

**RAÚL PINO DIEZ**

**PAOLO PRIORE**

**FCO. JAVIER PUENTE GARCÍA**

**ALBERTO GÓMEZ GÓMEZ**

**JOSÉ PARREÑO FERNANDEZ**

**ISABEL FERNÁNDEZ QUESADA**

**NAZARIO GARCÍA FERNÁNDEZ**

**RAFAEL ROSILLO CAMBLOR**

**BORJA PONTE BLANCO**

© 2019 Universidad de Oviedo  
© Los autores

Servicio de Publicaciones de la Universidad de Oviedo  
Campus de Humanidades. Edificio de Servicios. 33011 Oviedo (Asturias)  
Tel. 985 10 95 03 Fax 985 10 95 07  
[http: www.uniovi.es/publicaciones](http://www.uniovi.es/publicaciones)  
[servipub@uniovi.es](mailto:servipub@uniovi.es)

I.S.B.N.: 978-84-17445-38-6  
DL AS 1875-2019

Imprime: Servicio de Publicaciones. Universidad de Oviedo

Todos los derechos reservados. De conformidad con lo dispuesto en la legislación vigente, podrán ser castigados con penas de multa y privación de libertad quienes reproduzcan o plagien, en todo o en parte, una obra literaria, artística o científica, fijada en cualquier tipo y soporte, sin la preceptiva autorización.

## **Integrating Industry 4.0 with lean manufacturing**

**Keywords:** Industry 4.0; lean manufacturing; smart manufacturing; cyber-physical systems.

**Fortuny Santos J<sup>23</sup>, Luján Blanco I<sup>24</sup>, Ruiz de Arbulo López, P<sup>25</sup>, Sartal Rodríguez A<sup>26</sup>**

### **1 Introduction**

The Lean Production (Womack et al., 1990) system is the management approach that has allowed firms to advance in an ordered way through the various stages that lead to competitiveness because it allows products and services to be obtained fast and at low cost.

In 2011, to meet the growing challenges faced by industry in Europe, and especially in Germany, the term Industry 4.0 (from now on I4.0) or Fourth Industrial Revolution was coined at the Hannover Fair (Drath and Horch, 2014), although some authors consider that the I4.0 is nothing new but simply combines existing technologies and concepts (Buer et al., 2018). This ambiguity and the lack of a clear definition make implementation difficult.

This paper aims to fill this gap and to analyse the role played by the I4.0 tools in the lean production model.

---

<sup>23</sup>Jordi Fortuny Santos (✉ e-mail: jordi.fortuny@upc.edu)  
Department of Business Management, Universitat Politècnica de Catalunya (Technical University of Catalonia), Manresa, Spain.

<sup>24</sup>Itziar Luján Blanco (✉ e-mail: itziar.lujan@upc.edu)  
Department of Business Management, Universitat Politècnica de Catalunya (Technical University of Catalonia), Manresa, Spain.

<sup>25</sup>Patxi Ruiz de Arbulo López (e-mail: patxi.ruizdearbulo@ehu.eus)  
Business Organization Dept. Faculty of Engineering in Bilbao. University of The Basque Country, Bilbao, Spain.

<sup>26</sup>Antonio Sartal Rodríguez (e-mail: antoniosartal@uvigo.es)  
Research Group REDE-University of Vigo, Vigo, Spain.

## **2 Objectives**

The objective of this paper is to explore this new area of the I4.0 and to present the current state of research into the relation between the I4.0 and lean manufacturing. It aims to answer three questions: How can the I4.0 be integrated with lean philosophy? Will the computerisation of manufacturing make the lean principles unnecessary? Should the I4.0 be a facilitator of lean philosophy?

## **3 Methods**

A systematic review of the literature to find how the I4.0 can be integrated with lean manufacturing through the state of the art of research on this topic.

## **4 Results**

After the usual steps of a systematic review of the literature, 14 papers were considered relevant to our research. They show that the I4.0 approach can fit in a lean manufacturing model even though there is not yet a perfect fit between the two. The mistake that must be avoided is to digitalise and introduce technology without first transforming the firm to a lean philosophy. Once the firm has reviewed its processes in line with lean philosophy, the I4.0 will be an important new ally and a facilitator. Not only are lean principles not left behind by the I4.0 but they become more relevant in the new I4.0 factories which in essence have to be lean in order to meet new challenges.

## **5 Conclusion**

In general terms, I4.0 is the application to manufacturing of the latest advances in information technology. The bibliographical review shows that the I4.0 will become an important ally of lean philosophy. Every industrial revolution has had what are known as its “technological facilitators”. The technologies of the I4.0 will be its facilitators. To avoid failure, it is important for IT professionals to understand the needs of factories and for manufacturing professionals to understand IT capacities.

## **References**

- Buer, SV, Strandhagen, JO, Chan, FTS (2018) The link between Industry 4.0 and lean manufacturing: mapping current research and establishing a research agenda. *IJPR* 56 (8), pp 2924-2940.
- Drath, R, Horch, A (2014) Industrie 4.0: Hit or Hype? *IEEE Industrial Electronics Magazine* 8 (2): pp 56-58.