



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.

# **Emergent Approach of Occupational Health and Safety within the Servitization of Industry 4.0**

**Torrecilla-García JA<sup>135</sup>, Pardo-Ferreira MC<sup>136</sup>, Martínez-Rojas M<sup>137</sup>, Rubio-Romero JC<sup>138</sup>**

**Keywords:** Industry 4.0, Occupational Health and Safety, Servitization;

## **1 Introduction**

Since both Servitization and Industry 4.0 have deep implications for the value creation in manufacturing firms (Frank et al., 2019), scholars and practitioners have begun analysing the present and potential links between these two fields (Visnjic et al., 2019, Ardolino et al., 2017). Accordingly, the emergent trends of Servitization and Industry 4.0 in the industrial environment imply deep changes in the work organisation and in particular, the emergence of new risks at the workplace triggered by human-to-human and human-to-machine interactions. This circumstance can have the negative impact on the Occupational Health and Safety (OHS) (Badari et al., 2018), unless the new paradigm shift of the OHS management is introduced in manufacturing organizations.

## **2 Objectives**

The main objective of this research is to outline the conceptual framework of OHS approaches within the servitized Industry 4.0 considering different stages of the convergence of Servitization and Industry 4.0 in the manufacturing firms.

---

<sup>135</sup>Juan Antonio Torrecilla-García (✉ e-mail: juantorrecilla@uma.es)  
Dpto. de Organización de Empresas. Escuela de Ingenierías. Universidad de Málaga. C/ Dr. Ortiz Ramos S/N, 29071 Málaga (Spain).

<sup>136</sup>M<sup>a</sup> del Carmen Pardo-Ferreira (e-mail: carmenpf@uma.es)

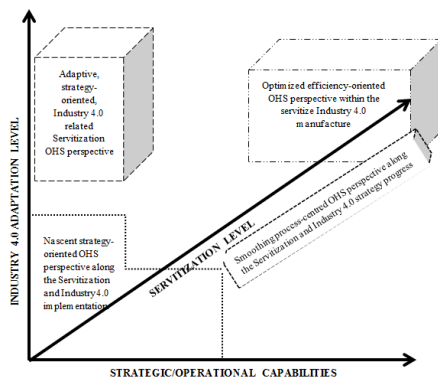
<sup>137</sup>María Martínez-Rojas (e-mail: mmrojas@uma.es)

<sup>138</sup>Juan Carlos Rubio-Romero (e-mail: juro@uma.es)

### 3 Methods

This paper provides the integrative scoping review of the literature on emergent approaches within the servitized Industry 4.0 manufacture as well as it proposes the general conceptual framework (Edmondson and McManus, 2007) of the emergent OHS transition classification.

### 4 Results



The conceptual framework of OHS within Industry 4.0 Servitization proposed in the paper, has stemmed from a contextualisation of the three dimensions of the OHS in servitized 4.0 manufacturing firms: strategic/operational capabilities, servitization level and Industry 4.0 adaptation level. Through a broader prism the four main challenge areas of the OHS in the servitized Industry 4.0 manufacturing firms have been suggested.

### 5 Conclusion

The new business models of manufacturing firms are more and more linked to the services-related and Industry 4.0-based transformation. This transition entails significant challenges and substantial impact on OHS policy in manufacturing organizations from the intertwined perspective of business, technology, processes and persons. Hence, the integration of servitization and Industry 4.0 perspective into the OHS strategies and processes will require special attention from both researches and practitioner to encompass different risk prevention requirements.

### References

Ardolino M, Rapaccini M, Saccani N, Gaiardelli P, Crespi G, Ruggeri C (2017) The role of digital technologies for the service transformation of industrial companies. *Int. J. Prod. Res.* 56 (6), 2116–2132. doi:10.1080/00207543.2017.1324224

Badri A, Boudreau-Trudel B, Souissi AS (2018) Occupational health and safety in the industry 4.0 era: A cause for major concern?. *Saf. Sci.* 109, 403–411.

Edmondson AC, McManus SE (2007) Methodological fit in management field research. *Acad Manage Rev.* 32 (4), 1155–1179.

Frank A G, Mendes G H, Ayala N F, Ghezzi A (2019) Servitization and Industry 4.0 convergence in the digital transformation of product firms: A business model innovation perspective. *Technol. Forecast. Soc. Chang.* 141, 341–351.

Visnjic I, Ringov D, Arts S (2019) Which service? How industry conditions shape firms' service type choices. *J. Prod. Innov. Manag.* doi.org/10.1111/jpim.12483.