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THE FOF-DESIGNER:  
DIGITAL DESIGN SKILLS FOR FACTORIES OF THE FUTURE

**Project Acronym:**  
DigiFoF



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**Project Coordinator:**  
ULBS

**Contributors:**  
All Partners

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<sup>1</sup> “Any communication or publication related to the action, made by the beneficiaries jointly or individually in any form and using any means, shall indicate that it reflects only the author's view and that the Agency and the Commission are not responsible for any use that may be made of the information it contains.”

**Table of Contents**

1	Introduction.....	3
2	Scientific Disseminations.....	3
2.1	Dissemination in Scientific Events.....	4
2.2	Dissemination in Scientific Journals.....	11
2.3	Dissemination in Scientific Conferences.....	14
3	Project White Papers.....	26
4	Press and Network Dissemination.....	27
4.1	Dissemination Articles in Austria.....	28
4.2	Dissemination Articles in France.....	28
4.3	Dissemination Articles in Germany.....	30
4.4	Dissemination Articles in Italy.....	31
4.5	Dissemination Articles in Poland.....	31
4.6	Dissemination Articles in Portugal.....	33
4.7	Dissemination Articles in Romania.....	33
5	Conclusions.....	35

## 1 Introduction

DigiFoF is a multidisciplinary project resulting from collaboration between academic and industrial partners to produce a collection of scientific-pragmatic outcomes.

The objective of deliverable 8.3 is to provide a list of scientific disseminations representing the academic aspects of the project. This deliverable facilitates sharing the academic knowledge through the network as well as with the whole FoF community. These disseminations publish the project outcomes and share its approach.

This document is organized based on three main categories of scientific dissemination as:

- Scientific Disseminations (in Events, Journals and Conferences): The project will produce various scientific papers presenting in events, journals and conferences. These papers are presented in Section 2.
- Project White Papers: The project partners will collaborately produce one white paper. The details of this paper is presented in Section 3.
- Press and Network Dissemination: Each partner will produce these papers either in english or in their local language. The detail of these papers is presented for each country each Section 4.

## 2 Scientific Disseminations

Scientific disseminations are produced by partners either in collaboration or based on special results or approach in their organizations. Three types of references for scientific disseminations are events, journals and conferences. The total number of contributions per country is presented in the table below.

Partners	Number of Scientific Event Organization	Number of Publications in Scientific Journals	Number of Publications in Scientific Conferences
<a href="#">Austria</a>	1	-	1
<a href="#">France</a>	1	3	7
<a href="#">Germany</a>	1	-	-
<a href="#">Italy</a>	-	1	-
<a href="#">Poland</a>	1 (2019) 2 (2020)	1 (2020)	1 (2020)
<a href="#">Portugal</a>	1(2019) 2 (2020)	-	3 (2020)
<a href="#">Romania</a>	1 (2019)	1(2020)	1+3

## 2.1 Dissemination in Scientific Events

Disseminations in scientific events are any publication presented in academic conferences, congresses or workshops. A primary list of these disseminations is presented here:

1. Special session coordinated by ULBS: Training workforce skills in digitalization era of Factory of the Future
2. Scientific workshop at PRO-VE 2019: Collaborative Decision-Making for Value creation Networks life-cycle management
3. PRO-VE 2019: 20th IFIP/SOCOLNET Working Conference on Virtual Enterprises
4. Management challenges (October 2019)
5. 11th International Conference on Engineering, Project, and Production Management (EPPM 2020)
6. Management challenges (February 2020)
7. DigiFoF Project Presentation at NEMO Summer School series

The details of all the above mentioned disseminations are presented hereafter.

<b>1. Special session coordinated by ULBS: Training workforce skills in digitalization era of Factory of the Future</b>	
<b>Type of event</b>	The 9th International Conference on Manufacturing Science and Education - MSE 2019 – SESSION 14 – TRAINING WORKFORCE SKILLS IN DIGITALIZATION ERA OF FACTORY OF THE FUTURE
<b>Subject</b>	Training workforce skills in digitalization era of Factory of the Future
<b>Abstract</b>	Industry 4.0, Smart Manufacturing, Factories of the Future (FoF) all describe aspects of the heralding era of digitalization of manufacturing aiming to interconnect every step of the manufacturing process and seamlessly integrate the physical and digital world. In FoF a central computer organizes the intelligent networking of all subsystems, suppliers and customers into one system. All relevant requirements concerning manufacturing and product are confirmed at design time, while execution takes place autonomously as ICT and automation are integrated. In the context of digitalization we consider there are three kind of challenges: one which targets the companies, other which target the employees, and the last one aiming the educational system which should include in its curricula bachelor and master study programs which prepare students for the following jobs: Virtual Reality/Augmented Reality System Specialist, Digital Manufacturing Engineer, Digital Factory Automation Engineer, Chief Digital Officer, etc. The main important challenge is represented by educational system, how prepared is to provide students, future employees, the digital competences necessary for the Factories of the Future. What are the structural and curricular measures Higher Education Institutions need to take in order to align engineering education, especially in the design of all constituents of Factories of the Future, with the need of competences in new manufacturing era?
<b>Topics of Interest</b>	<ul style="list-style-type: none"> <li>• Modeling tools for manufacturing processes</li> </ul>

<b>1. Special session coordinated by ULBS: Training workforce skills in digitalization era of Factory of the Future</b>	
	<ul style="list-style-type: none"> <li>• Problem based learning in manufacturing systems design</li> <li>• Digital design skills for factories of the future</li> </ul>
<b>Organizers</b>	Prof. Adrian Florea, Prof. Nicolae Cofaru / “Lucian Blaga” University of Sibiu, Romania, Faculty of Engineering
<b>Papers</b>	<ul style="list-style-type: none"> <li>• Daniel Volovici and Daniel-Cristian Craciunean. MM-DSL, SUPPORT FOR IMPLEMENTING MODELING TOOLS FOR MANUFACTURING PROCESSES</li> <li>• Adrian Florea. DIGITAL DESIGN SKILLS FOR FACTORIES OF THE FUTURE</li> <li>• Ion Mironescu. AN ADOxx BASED ENVIRONMENT FOR PROBLEM BASED LEARNING IN MANUFACTURING SYSTEMS DESIGNS</li> </ul>

<b>2. Scientific workshop at PRO-VE 2019: Collaborative Decision-Making for Value creation Networks life-cycle management</b>	
<b>Type of event</b>	Scientific workshop composed with two special sessions
<b>Subject</b>	Collaborative Decision-Making for Value creation Networks life-cycle management
<b>Abstract</b>	Value creation networks aim at efficient and flexible industrial symbioses of enterprises contributing to a value chain. The efficiency and flexibility of process configuration and optimization within these networks is a core challenge in today’s manufacturing industries and influence their supply chain environments. The scientific workshop aims at gathering scientific points of views on complementary challenges for the design and implementation of ‘data-based collaborative decision-making’ for value networks life-cycle management
<b>Topics of Interest</b>	<p><i>Session 1-Data management to support collaboration in value creation network’s life-cycles</i></p> <p>This special session addresses the two fist challenges of the workshop, thus the integration and management of data, information and Knowledge to support these collaborative life-cycles.</p> <p><u>Topics of interest include but are not limited to:</u></p> <ul style="list-style-type: none"> <li>- Data integration and interoperability for value network life-cycle management.</li> <li>- Ecosystems of industrial data marketplace (e.g. architectures, reference processes, certification frameworks and standards)</li> <li>- Data usage control and identity management(e.g. identity management, access control, policy enforcement environment)</li> <li>- Data access service and usage (e.g. automated contracting data access capabilities like secrecy, time to live, anonymization, separation of duties, scope of usage) to support collaboration.</li> <li>- Data analysis to create added-value</li> </ul>

2. Scientific workshop at PRO-VE 2019: Collaborative Decision-Making for Value creation Networks life-cycle management	
	<ul style="list-style-type: none"> <li>- Analysis, visualization and knowledge management techniques (e.g. analysis support, preventive vs corrective approaches)</li> </ul> <p><i>Session 2-Collaborative decision-making for life-cycle management of value creation networks</i></p> <p>This special session addresses the third challenge of the workshop, on collaborative decision-making processes and solutions to support life-cycle management.</p> <p><u>Topics of interest include but are not limited to:</u></p> <ul style="list-style-type: none"> <li>- Collaborative decision making techniques for value creation (e.g. intelligent/smart mechanisms, machine learning and training)</li> <li>- Conceptual modelling and configuration methods to manage collaborative decision making (e.g. knowledge models for machine interpretation, machine learning, data models, data policy administration and evaluation)</li> <li>- Collaborative decision-process for value network creation and life-cycle management</li> <li>- Decision-Making to support for value creation in circular economy</li> <li>- Collaborative management and governance structures of value creation networks (e.g. digitized business models, domain models, collaboration models)</li> <li>- Data driven solutions for collaborative industrial networks life-cycle management (e.g. zero-defect manufacturing, additive manufacturing, disruptive business models)</li> </ul>
<b>Organizators</b>	<ul style="list-style-type: none"> <li>▪ Prof. Dimitris Karagianis, Austria</li> <li>▪ Dr. Mario Lezoche, France</li> <li>▪ Prof. Xavier Boucher, France</li> <li>▪ Prof. David Romero, Mexico</li> </ul>
<b>Papers</b>	<p><i>Session 1-Data management to support collaboration in value creation network's life-cycles</i></p> <ol style="list-style-type: none"> <li>1. Data Privacy Concerns Throughout the Customer Journey and Different Service Industries. Marko Mäki, Ari Alamäki</li> <li>2. Data-driven pattern-based constructs definition for the digital transformation modelling of collaborative networked manufacturing enterprises. Concetta Semeraro, Mario Lezoche, Hervé Panetto, Michele Dassisti, Stefano Cafagna</li> <li>3. Connected and multimodal passenger transport through big data analytics Case Tampere City Region, Finland. Riku Viri, Lili Aunimo, Heli Aramo-Immonen</li> </ol> <p><i>Session 2-Collaborative decision-making for life-cycle management of value creation networks</i></p> <ol style="list-style-type: none"> <li>4. A Business Model assessment and evaluation framework for city logistics collaborative strategic decision support. Giovanni Zenezini, Jesus Gonzalez-Feliu, Giulio Mangano, Laura Palacios-Arguello.</li> </ol>

<b>2. Scientific workshop at PRO-VE 2019: Collaborative Decision-Making for Value creation Networks life-cycle management</b>	
	<ol style="list-style-type: none"> <li>5. Framework to model PSS collaborative value networks and assess uncertainty of their economic models. Xavier Boucher, Khaled Medini, Camilo Murillo Coba</li> <li>6. Discrete Event Simulation as a support in the decision making to improve product and process in the automotive industry - A fuel pump component case study. Luis E. Villagomez, Daniel Cortés, José Ramírez, Alejandro Álvarez, Rafael Batres, Ivann Reyes, Germán Esparza, Nancy Cruz, Arturo Molina.</li> <li>7. Assessment of failures in collaborative Human-Robot assembly workcells. Domenico A. Maisano, Dario Antonelli and Fiorenzo Franceschini</li> </ol>
<b>3. PRO-VE 2019: 20<sup>th</sup> IFIP/SOCOLNET Working Conference on Virtual Enterprises</b>	
<b>Type of event</b>	Scientific working conference
<b>Subject</b>	Collaborative Networks and Digital Transformation
<b>Abstract</b>	<p>The 4th Industrial Revolution and its wide variety of emerging dimensions are characterized both by their required extensive digitalization as well as strong interconnections among their composed systems, products, services, value chains, and business models, among others. The increasing availability of sensors and the smart and mobile devices connected to the Internet, powered by pervasiveness of Cyber-Physical Systems and Internet of Things equipped with distributed computational power and intelligence, have boosted hyper-connected organizations. The focal points of this revolution span over: vertical integration of smart production systems, horizontal integration of organizations through global value chain networks, adoption of through-engineering across the entire value chain, acceleration in manufacturing and service provision, and digitalization of provided products and services, giving rise to new business models that support customer intimacy. Next to Industry 4.0, the same trends increasingly surface in many other areas and sectors, including: Economy 4.0, Health 4.0, Agriculture 4.0, Transportation 4.0, Water 4.0, Tourism 4.0, Logistics 4.0, etc. It is therefore needed to better understand the potential role of collaborative approaches in this context.</p>
<b>Topics of Interest</b>	<ul style="list-style-type: none"> <li>- Collaborative models, platforms and systems for digital revolution</li> <li>- Manufacturing ecosystem and collaboration in Industry 4.0</li> <li>- Big data analytics and intelligence</li> <li>- Risk, performance, and uncertainty in collaborative networked systems</li> </ul>

3. PRO-VE 2019: 20 <sup>th</sup> IFIP/SOCOLNET Working Conference on Virtual Enterprises	
	<ul style="list-style-type: none"> <li>- Semantic data/service discovery, retrieval, and composition in a collaborative networked world</li> <li>- Trust and sustainability analysis in collaborative networks</li> <li>- Value creation and social impact of collaborative networks to the digital revolution</li> <li>- Technology development platforms supporting collaborative systems</li> <li>- Collaborative manufacturing and factories of the future, e-health and care, food and agribusiness, and crisis/disaster management.</li> </ul>
<b>Organizers</b>	<ul style="list-style-type: none"> <li>▪ Prof. Dario Antonelli, Italy [SOCOLNET member]</li> <li>▪ Prof. Luis M. Camarinha-Matos, Portugal [SOCOLNET President]</li> <li>▪ Prof. Hamideh Afsarmanesh, Netherlands [SOCOLNET General Assembly chair]</li> </ul>
<b>Papers</b>	<p>The conference includes 57 papers, including the ones for the special Workshop organized by DigiFoF and hosted by PRO-VE 2019 (item 2 above):</p> <p><i>Session 1-Data management to support collaboration in value creation network's life-cycles</i></p> <p><i>Session 2-Collaborative decision-making for life-cycle management of value creation networks</i></p> <p>Proceedings are published by Springer under the title: "Collaborative Networks and Digital Transformation".</p>

4. Scientific session at DoCEIS 2020: Digital twins and smart manufacturing	
<b>Type of event</b>	Session at Conference: DoCEIS 2020 - 11th IFIP WG 5.5/SOCOLNET Advanced Doctoral Conference on Computing, Electrical and Industrial Systems Caparica, Portugal, 1-3 Jul 2020
<b>Subject</b>	Digital twins and smart manufacturing
<b>Topics of Interest</b>	<ul style="list-style-type: none"> <li>- Cyber-Physical Systems</li> <li>- Digital twins</li> <li>- Industry 4.0</li> <li>- Digital transformation</li> </ul>
<b>Organizers</b>	Luis Camarinha-Matos (SOCOLNET)
<b>Papers</b>	<ol style="list-style-type: none"> <li>1. <i>Artem A. Nazarenko and Luis M. Camarinha-Matos</i>: The Role of Digital Twins in Collaborative Cyber-Physical Systems</li> <li>2. <i>Fabio Seixas-Lopes, Jose Ferreira, Carlos Agostinho, and Ricardo Jardim-Goncalves</i>: Production Process Modelling Architecture to Support Improved Cyber-Physical Production Systems</li> <li>3. <i>Bardia Naghshineh and Helena Carvalho</i>: The Impact of Additive Manufacturing on Supply Chain Resilience</li> <li>4. <i>Felipe A. Coda, Diolino J. Santos Filho, Fabr í cio Junqueira, and Paulo E. Miyagi</i> : Big Data Acquisition Architecture: An Industry 4.0 Approach</li> </ol>



<b>5. Scientific session at DoCEIS 2020: Collaborative Networks</b>	
<b>Type of event</b>	Session at Conference: DoCEIS 2020 - 11th IFIP WG 5.5/SOCOLNET Advanced Doctoral Conference on Computing, Electrical and Industrial Systems Caparica, Portugal, 1-3 Jul 2020
<b>Subject</b>	Collaborative Networks
<b>Topics of Interest</b>	<ul style="list-style-type: none"> <li>- Collaborative enterprise networks</li> <li>- Business ecosystems</li> <li>- Digital transformation</li> </ul>
<b>Organizers</b>	Luis Camarinha-Matos (SOCOLNET)
<b>Papers</b>	<ol style="list-style-type: none"> <li>1. <i>Paula Graça and Lu í s M. Camarinha-Matos: Performance Indicators of a Collaborative Business Ecosystem – A Simulation Study.</i></li> <li>2. <i>Majid Zamiri and Luis M. Camarinha-Matos: Towards a Reference Model for Mass Collaborative Learning.</i></li> <li>3. <i>Kankam O. Adu-Kankam and Luis M. Camarinha-Matos: A Framework for Behavioural Change Through Incentivization in a Collaborative Virtual Power Plant Ecosystem .</i></li> </ol>

<b>6. Management challenges (4 December 2019)</b>	
<b>Type of event</b>	Scientific Seminar
<b>Subject</b>	Digital competencies for Factory of Future
<b>Abstract</b>	In progress
<b>Topics of Interest</b>	Competency model of employees of Factory of Future Needs and demands of Factory of Future
<b>Organizers</b>	Arkadiusz Jurczuk, Faculty of Engineering Management, Bialystok University of Technology; Scientific Society of Organisations and Management, Bialystok Chapter
<b>Papers</b>	Presentation only

<b>7. 11th International Conference on Engineering, Project, and Production Management (EPPM 2020, 20-22 September 2020)</b>	
<b>The EPPM Conference has been postponed and will be held in Krakow from 19-21 September 2021</b>	
<b>Type of event</b>	International Conference
<b>Subject</b>	Digital competencies for Factory of Future
<b>Abstract</b>	In progress

<b>7. 11th International Conference on Engineering, Project, and Production Management (EPPM 2020, 20-22 September 2020)</b>	
The EPPM Conference has been postponed and will be held in Krakow from 19-21 September 2021	
<b>Topics of Interest</b>	Business process management Digital competencies for Factory of Future
<b>Organizers</b>	Faculty of Engineering Management, Bialystok University of Technology
<b>Papers</b>	In progress

<b>8. Management challenges (February 2020)</b>	
Scientific Seminar has been postponed (October 2020, depending on domestic regulations)	
<b>Type of event</b>	Scientific Seminar
<b>Subject</b>	Digital competencies for Factory of Future
<b>Abstract</b>	In progress
<b>Topics of Interest</b>	In progress
<b>Organizers</b>	Arkadiusz Jurczuk, Faculty of Engineering Management, Bialystok University of Technology; Scientific Society of Organisations and Management, Bialystok Chapter
<b>Papers</b>	In progress

<b>9. DigiFoF Project Presentation at NEMO Summer School 2019</b>	
<b>Type of event</b>	Presentation during an Academic Program
<b>Subject</b>	The EU project: DigiFoF
<b>Topics of Interest</b>	Part of the Nemo Summer School was the presentation of the DigiFoF project. During this presentation the need for the DigiFoF project, the idea, the objectives and goals of the project as well as the work packages and the expected results were presented. Programme: <a href="https://nemo.omilab.org/nemo/wp-content/uploads/2019/10/NEMO2019_Programme-Booklet.pdf">https://nemo.omilab.org/nemo/wp-content/uploads/2019/10/NEMO2019_Programme-Booklet.pdf</a>
<b>Organizers</b>	Organizer: Prof. Dimitris Karagiannis, University of Vienna Presenter: Wilfrid Utz, OMiLAB NPO

<b>10. PROVE 2020 : See Socolnet ???</b>	
Type of event	
Subject	
Topics of Interest	
Organizers	
Papers	In progress

## 2.2 Dissemination in Scientific Journals

Disseminations in scientific journals are publications in scientific periodicals.

The details of all the above mentioned disseminations are presented hereafter.

<b>1. Specifying a modelling language for PSS Engineering – A development method and an operational tool</b>	
Authors	Khaled Medini, Xavier Boucher
Title	Specifying a modelling language for PSS Engineering – A development method and an operational tool
Journal and references	Computers in Industry, 108, pp. 89-103
Date	March 2019
DOI	10.1016/j.compind.2019.02.014
Publication status	Published
Web	<a href="https://www.sciencedirect.com/science/article/pii/S0166361518306547">https://www.sciencedirect.com/science/article/pii/S0166361518306547</a>
Keywords	PSS engineering, conceptual modelling, modelling language, domain specific modelling, model based system engineering
Abstract	Although the literature is full of research works about the transition of the industry towards Product-Service Systems (PSS), the question of how to effectively support PSS engineering is poorly addressed. The compelling need for a decision support throughout the various stages of the engineering process is particularly owed to PSS inherent complexity. In this sense, visualisation and modelling at large have been put forth as promising means for supporting the PSS engineering. This paper proposes a method for specifying a modelling language for PSS engineering, putting together PSS domain specific knowledge and modelling concepts inherited from conceptual modelling and model based engineering. This relies on a recursive transformation process of the underlying PSS meta-model using knowledge from case studies and from literature. The method has proven to be a practical means for a gradual enrichment of the modelling language leading to successful experimentations in industrial context.

<b>2. In progress (Engineering Management in Production and Services)</b>	
<b>Authors</b>	Arkadiusz Jurczuk, Katarzyna Dębkowska, Alicja Gudanowska
<b>Title</b>	In progress
<b>Journal and references</b>	Engineering Management in Production and Services
<b>Date</b>	2020
<b>DOI</b>	-
<b>Publication status</b>	In progress
<b>Web</b>	<a href="https://www.empas.pb.edu.pl/">https://www.empas.pb.edu.pl/</a>
<b>Keywords</b>	-
<b>Abstract</b>	-

<b>3. Digital technologies in Product-Service Systems: a literature review and a research agenda</b>	
<b>Authors</b>	Fabiana Pirola, Xavier Boucher, Stephan Wiesner, Giuditta Pezzotta
<b>Title</b>	Digital technologies in Product-Service Systems: a literature review and a research agenda
<b>Journal and references</b>	Computers in industry
<b>Date</b>	2020
<b>DOI</b>	
<b>Publication status</b>	under review
<b>Web</b>	
<b>Keywords</b>	Smart Product-Service System; Digital Servitization; Digitalization; Research Topic Modeling; Literature Review
<b>Abstract</b>	<p>Digital technologies are changing the everyday life of citizens and are radically changing the nature of products and services, especially since Industry 4.0 phenomenon has gained popularity all around the world. By analyzing the concept of smart PSS, this paper questions the convergence between digital and service orientations for industrial companies and considers how digital technologies are used to enable decisions along the PSS lifecycle (e.g., design stage, operational stage) and/or at different planning levels (i.e., from strategic to operational level). Thus, this led to the following research questions:</p> <ol style="list-style-type: none"> <li>1. Which are the main research streams and to what extent are digital technologies considered in PSS literature?</li> <li>2. Which are the main areas that are worth to be investigated in future researches?</li> </ol>

4. A conceptual framework for operationalizing the Circular Servitization: End of Life Management in industrial machinery	
<b>Authors</b>	Elaheh Maleki, Xavier Boucher
<b>Title</b>	A conceptual framework for operationalizing the Circular Servitization: End of Life Management in industrial machinery
<b>Journal and references</b>	International Journal of Operations & Production Management
<b>Date</b>	Submission June 2020
<b>DOI</b>	
<b>Publication status</b>	Under Review
<b>Web</b>	
<b>Keywords</b>	Product-Service System (PSS), Circular Economy, Circular Servitization, Industrial Services, Industrial Machinery, Second-Hand Machinery
<b>Abstract</b>	<p><u>Purpose:</u> This paper aims to provide a conceptual framework for circular EOL management to support the decision-making process to choose the best EOL management services in an industrial context.</p> <p><u>Design/methodology/approach:</u> A Case-Base research methodology is applied through 3 steps. (1) The domain knowledge is analyzed. (2) A conceptual framework is created based on interdisciplinary literature analysis. (3) A Scenario-Based Test is used for validation of the applicability of the framework through a long-term collaboration with the company and a final interview with the project manager in a second-hand machinery case.</p> <p><u>Findings:</u> Six decision-making points for EOL management are revealed and a procedure to choose the best EOL management services is proposed.</p> <p><u>Originality:</u> This research contributes to the sustainable EOL management literature by identifying and classifying the different types of EOL services based on the circular economy.</p>

5. Software Application for Organizational Sustainability Performance Assessment	
<b>Authors</b>	Greco, V.; Ciobotea, R.-I.-G.; Florea, A.
<b>Title</b>	Software Application for Organizational Sustainability Performance Assessment., 12, 4435.
<b>Journal and references</b>	Sustainability
<b>Date</b>	May 2020
<b>DOI</b>	
<b>Publication status</b>	Published
<b>Web</b>	<a href="https://ideas.repec.org/a/gam/jsusta/v12y2020i11p4435-d364730.html">https://ideas.repec.org/a/gam/jsusta/v12y2020i11p4435-d364730.html</a>

5. Software Application for Organizational Sustainability Performance Assessment	
<b>Keywords</b>	sustainability reporting; sustainability assessment; indicators; sustainable organization; business intelligence; decision making
<b>Abstract</b>	Sustainability performance assessment is a challenge for many companies due to the heterogeneity of indicators and the lack of a standardized reporting framework. This paper describes a software solution that simplifies the sustainability reporting process and is useful for decisions concerning sustainable management. We analyzed various indicators from public sustainability reports of five companies and obtained some relevant results using the tool that we developed based on mathematic algorithms and an aggregation model of different indicators. The software application calculates a Global Sustainability Index based on the proposed model of the sustainable organization described in this paper. An optimal solution is very rare in the transition towards the sustainable organization and compromises are required most frequently between environmental, economic and social aspects on the one hand and the expectations of the stakeholders on the other hand. The proposed tool helps users to cope with these challenges and takes into consideration that information is not always available and precise. Another feature offered by the tool is that besides simplifying sustainability performance assessment, it highlights low performance indicators and offers suggestions for improvement based on a genetic algorithm.

### 2.3 Dissemination in Scientific Conferences

Disseminations in scientific conferences are publications in conferences dedicated to the academic community.

The details of all the above mentioned disseminations are presented hereafter.

1. Towards a risk-oriented Smart PSS Engineering framework	
<b>Authors</b>	Camilo Murillo Coba, Xavier Boucher, Jesus Gonzalez-Feliu, François Vuillaume, Alexandre Gay
<b>Title</b>	Towards a risk-oriented Smart PSS Engineering framework
<b>Conference</b>	CMS'2020, 53rd CIRP Conference on Manufacturing Systems
<b>References</b>	
<b>Date</b>	1-3 july 2020
<b>Place</b>	Chicago, USA
<b>Publication status</b>	Future
<b>Web</b>	
<b>Keywords</b>	Smart PSS engineering, Risk management for Smart PSS, Smart PSS value network
<b>Abstract</b>	Manufacturers have started exploiting the benefits of Internet-of-things and Artificial intelligence to offer solutions known as "Smart PSS." Recently, smart PSS engineering frameworks have begun appearing. Those frameworks lack guidelines on how to conduct risk

1. Towards a risk-oriented Smart PSS Engineering framework	
	management activities throughout the design and development of a smart PSS solution. This paper presents a framework aimed at designing Smart PSS solutions, necessary value networks to deliver the smart PSS solution, and the economic models associated with these value networks. The framework is currently being applied to a case study involving a gas boiler manufacturer.
2. A Smart Innovation Environment for Digital Engineers	
<b>Authors</b>	Dimitris Karagiannis, Robert Andrei Buchmann, Xavier Boucher, Sergio Cavalieri, Adrian Florea, Dimitris Kiritsis
<b>Title</b>	A Smart Innovation Environment for Digital Engineers
<b>Conference</b>	PRO-VE 2020, 21th IFIP Working Conference on Virtual Enterprises
<b>References</b>	
<b>Date</b>	September 2020
<b>Place</b>	Valencia Spain
<b>Publication status</b>	Future
<b>Web</b>	
<b>Keywords</b>	Digital Twin, Digital Engineer, Agile Modelling Method Engineering, Cyber-Physical Systems
<b>Abstract</b>	<p>The paper introduces a Smart Innovation Environment for the development of Digital Twins and experimentation related to digital transformation projects, thus consolidating the "Digital Engineer" skill profile (with a business-oriented facet labelled as "Digital Innovator"). In the Internet of Things (IoT) era, this profile implies not only the ability to perform both digital design and engineering activities, but also to semantically bridge multiple layers of abstraction, granularity or technical specificity – from high level business analysis down to cyber-physical engineering. In the paper's proposal, conceptual modelling methods and interoperable modelling environments are tailored to enable such integration through the creation of Digital Twins, as assets or manifestations of digital business models resulting from innovation processes.</p> <p>The architecture of the proposed environment is guided by a Design Research perspective – i.e., we introduce it as a treatment to an education "design problem" regarding the Digital Engineer skill profile during the IoT era. The integrated skillset corresponding to such profiles requires facilitators for Solution Co-creation, Digital Twin development and Agile Engineering of both software services and cyber-physical systems. The proposed environment encompasses workspaces and resource packages acting as such enablers, currently evaluated in "innovation corners" deployed across the Open Models Laboratory digital eco-system.</p>

<b>3. Value Proposition Prototyping in Smart PSS Engineering: Case Study in Thermotechnology Industry</b>	
<b>Authors</b>	Camilo Murillo Coba, Xavier Boucher, François Vuillaume, Alexandre Gay, Jesus Gonzalez-Feliu
<b>Title</b>	Value Proposition Prototyping in Smart PSS Engineering: Case Study in Thermotechnology Industry
<b>Conference</b>	PRO-VE 2020, 21th IFIP Working Conference on Virtual Enterprises
<b>References</b>	
<b>Date</b>	September 2020
<b>Place</b>	Valencia Spain
<b>Publication status</b>	Future
<b>Web</b>	
<b>Keywords</b>	Smart PSS, PSS design, Value proposition, Risk review
<b>Abstract</b>	This paper proposes a smart PSS engineering approach, aimed at eliciting stakeholder needs, prototyping the value proposition, representing how the stakeholders will capture value and identifying/prioritizing risks from the value proposition. The approach addresses two gaps in the field of smart PSS design: (i) the need of visualization solutions to support the transformation of value propositions for the stakeholders into a contract mechanism supporting value capture by the offering company and (ii) the importance of risk management during the design of Smart PSS value proposition.

<b>4. Reconfigurable Digitalized and Servitized Production Systems: Requirements and Challenges</b>	
<b>Authors</b>	Magdalena Paul, Audrey Cerqueus, Daniel Schneider, Hichem Haddou Benderbal, Xavier Boucher, Damien Lamy, Gunther Reinhart
<b>Title</b>	Reconfigurable Digitalized and Servitized Production Systems: Requirements and Challenges
<b>Conference</b>	APM2020, IFIP International Conference on Advances in Production Management Systems
<b>References</b>	
<b>Date</b>	August 2020
<b>Place</b>	Novi Sad, Serbia
<b>Publication status</b>	Future
<b>Web</b>	
<b>Keywords</b>	Reconfigurability, Digitalization, Servitization, Sustainability



#### 4. Reconfigurable Digitalized and Servitized Production Systems: Requirements and Challenges

<b>Abstract</b>	Reconfigurable manufacturing systems (RMS) emerged in the literature during the last two decades and aim to answer to the rapid increase of demand and variants of products. The implementation of such solutions in the industry is very recent and remains difficult. In this article, an analysis of the industrial requirements and challenges regarding four key aspects of RMS (reconfigurability, digitalization, servitization and sustainability) is drawn from interviews conducted. Further, the requirements and challenges are compared to those encountered in literature.
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#### 5. Simulation-based approach to apply uncertainty evaluation framework for PSS economic models

<b>Authors</b>	Coba Camilo Murillo, Xavier Boucher, Khaled Medini, and Jesus Gonzalez-Feliu
<b>Title</b>	Simulation-based approach to apply uncertainty evaluation framework for PSS economic models
<b>Conference</b>	11th CIRP Conference on Industrial Product-Service Systems, IPS2 2019
<b>References</b>	Procedia CIRP 83 (2019): 50-56
<b>Date</b>	29-31 May 2019
<b>Place</b>	Zhuhai & Hong Kong, China
<b>Publication status</b>	Published
<b>Web</b>	Available online at <a href="http://www.sciencedirect.com">www.sciencedirect.com</a>
<b>Keywords</b>	Uncertainty; PSS economic models; PSS simulation; PSS value chains
<b>Abstract</b>	PSS offerings are characterized by a high level of uncertainties due to the lack of information, in the design stage of the offer, about future events that the decision-makers will face. Such uncertainties must be anticipated to validate the profitability of PSS projects. In this paper, an approach to assess uncertainty is presented, then applied to a case study. It is based on the integration of the usual uncertainty management framework together with the quantitative uncertainty assessment approach. The method and implementing tools are presented, together with the application to an industrial case study.

#### 6. Framework to model PSS collaborative value networks and assess uncertainty of their economic models

<b>Authors</b>	Xavier Boucher, Khaled Medini, Coba Camilo Murillo
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<b>6. Framework to model PSS collaborative value networks and assess uncertainty of their economic models</b>	
<b>Title</b>	Framework to model PSS collaborative value networks and assess uncertainty of their economic models
<b>Conference</b>	PRO-VE 2019, 20th IFIP Working Conference on Virtual Enterprises
<b>References</b>	Springer proceedings, PRO-VE 2019 on Collaborative Networks and Digital Transformation
<b>Date</b>	23-25 September 2019
<b>Place</b>	Turin, Italy
<b>Publication status</b>	Published
<b>Web</b>	<a href="https://www.springer.com/">https://www.springer.com/</a>
<b>Keywords</b>	Product Service Systems, Value network, Economic models
<b>Abstract</b>	<p>This paper presents a framework for addressing the challenge of economic value sharing among actors of Product-Service value networks. More specifically the framework is dedicated to the assessment of alternative collaborative value networks and their associated economic models, at the time of designing a product-service system (PSS). The framework includes three main components: modelling, simulation and uncertainty assessment. The framework is briefly presented as parts of its components were discussed in previous research. The paper provides an illustration with a design project of a PSS solution in the agro-alimentary industry, requiring a balanced configuration of collaborative value network.</p>

<b>7. Human resources barriers and drivers in SME's digital servitization: French case studies</b>	
<b>Authors</b>	Nadine Dubruc, Sophie Peillon
<b>Title</b>	Human resources barriers and drivers in SME's digital servitization: French case studies
<b>Conference</b>	Spring Servitization conference: Delivering Services Growth in the Digital Era
<b>References</b>	ISBN: 978 1 85449 463 4
<b>Date</b>	13 - 15 May 2019
<b>Place</b>	Linköping, Sweden
<b>Publication status</b>	Published
<b>Web</b>	Available online at <a href="https://www.advancedservicesgroup.co.uk/ssc-2019-proceedings">https://www.advancedservicesgroup.co.uk/ssc-2019-proceedings</a>
<b>Keywords</b>	Human Resources, Servitization, Digitalization

### 7. Human resources barriers and drivers in SME's digital servitization: French case studies

<b>Abstract</b>	<p>In one hand, Servitization modifies in depth three organizational dimensions: corporate culture, human resource management and organizational structures (Gebauer &amp; al., 2012; Neu &amp; Brown, 2005; Oliva and Kallenberg, 2003). In the six elements defined by Baines and Lightfoot (2013), organizational factors are recognized as a key issue within the servitization process of goods manufacturers. On the other hand, Digitalization is one of the major trends that will change business in future years (Porter and Heppelmann, 2014; Clegg and al, 2017; Zheng and al, 2018). It must be consider also as one important organizational change in SMEs (Parviainen et al. 2017). There is little in-depth research on human resources elements. Porter and Heppelmann (2014), Lerch and Gotsch (2015), Coreynen and al (2017), Suesse et al. (2018) point a lack of qualified employees to develop and provide such services in a digital context. In this paper, we focus on HRM challenges in SMEs, on HRM barriers caused by the necessary modifications to be able to develop services and digitalization. By knowing the Human Resources points that are problems in services, we can suggest some solutions to prevent or to deal with this issue. We observed Human Resources practices by strategic areas: staffing, compensating and motivating (Garand, 1992; Thévenet et al., 2009). "Staffing" covers recruitment, job definition, skills and career management, training... "Compensating" concerns remuneration, pension and retirement. "Motivating" is about work organization, how responding to individual needs and expectations.</p>
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### 8. Improving Training Methods for Industry Workers though AI Assisted Multi-Stage Virtual Reality Simulations

<b>Authors</b>	Alexandru BUTEAN, Marco Leon OLESCU, Nicolae Adrian TOCU, Adrian FLOREA
<b>Title</b>	Improving Training Methods for Industry Workers though AI Assisted Multi-Stage Virtual Reality Simulations
<b>Conference</b>	The 15 <sup>th</sup> International Scientific Conference, eLearning and Software for Education, Bucharest, April 11-12, 2019
<b>References</b>	DOI: 10.12753/2066-026X-19-007
<b>Date</b>	11-12 April, 2019
<b>Place</b>	Bucharest, Romania
<b>Publication status</b>	Published
<b>Web</b>	Available online at <a href="https://search.proquest.com/docview/2213790736/fulltextPDF/DC5901B237BE4431PQ/1?accountid=8083">https://search.proquest.com/docview/2213790736/fulltextPDF/DC5901B237BE4431PQ/1?accountid=8083</a>

<b>8. Improving Training Methods for Industry Workers through AI Assisted Multi-Stage Virtual Reality Simulations</b>	
<b>Keywords</b>	Industry 4.0; Virtual Reality; Training; Artificial Intelligence.
<b>Abstract</b>	<p>For industry workers in the manufacturing space, the most time-consuming and less-productive process is represented by the multitude of training stages. For each new process / module / change in the manufacturing flow, there is a need for another customized training stage. For demanding industries (automotive, toys factories, household appliances, etc.) where customization is the key to sell more products, the time spent for preparing, designing and training people for new scenarios represents an important parameter that influences the production cycle efficiency. The current paper presents a solution to improve the measured performance on a new custom given task added to an existing scenario, using a multi-stage virtual reality (VR) simulator. The simulator acts as a digital twin for a physical testbed that offers 20+ parts to build the end product. To prove the performance of the solution, the first experiment uses a realistic multi-layered toy car as the end product. Both activities (real and virtual) are favoring the exploration of the building process, allowing the user (trainee) to discover multiple solutions that should lead to the same final result. The course of actions is supervised by an adaptive AI algorithm that compares the progress made by previous attempts (successful or not) with the ongoing attempt of a user and offers real-time guidance. Aside from using a gamified lego-like experience, the described approach contributes to the training process by offering personalized contextual suggestions, advices and tips. The article contains a serious state of the art study, current version specifications and objectives, details regarding the architecture of the solution, development components, results, comparative experimental tests and conclusions.</p>

<b>9. In progress (The 11th International Conference on Engineering, Project, and Production Management (EPPM 2020))</b>	
<b>Authors</b>	Arkadiusz Jurczuk, Alicja Gudanowska
<b>Title</b>	In progress
<b>Conference</b>	The 11th International Conference on Engineering, Project, and Production Management (EPPM 2020) International Conference
<b>References</b>	-
<b>Date</b>	The EPPM Conference has been postponed and will be held in Krakow from 19-21 September 2021
<b>Place</b>	Cracow, Poland


9. In progress (The 11th International Conference on Engineering, Project, and Production Management (EPPM 2020))	
Publication status	In progress
Web	<a href="https://eppm2020.pl/">https://eppm2020.pl/</a>
Keywords	-
Abstract	-

10. The Role of Digital Twins in Collaborative Cyber-Physical Systems	
Authors	Artem A. Nazarenko and Luis M. Camarinha-Matos
Title	The Role of Digital Twins in Collaborative Cyber-Physical Systems
Conference	DoCEIS 2020 - 11th IFIP WG 5.5/SOCOLNET Advanced Doctoral Conference on Computing, Electrical and Industrial Systems
References	<a href="https://doi.org/10.1007/978-3-030-45124-0_18">https://doi.org/10.1007/978-3-030-45124-0_18</a>
Date	1-3 July 2020
Place	Costa de Caparica, Portugal
Publication status	Published
Web	<a href="https://link.springer.com/chapter/10.1007/978-3-030-45124-0_18">https://link.springer.com/chapter/10.1007/978-3-030-45124-0_18</a>
Keywords	Collaborative cyber-physical systems, Digital Twins, Smart home
Abstract	<p>The growing smartification of devices and systems, combining physical and virtual parts, offers a great potential to improve the daily life of people through the establishment of context-rich environments. Cyber-Physical Systems (CPS), embedding collaborative features, can be considered as one of the key enablers of such environments, providing support for life quality improvement. Besides the general aim of the conventional CPS, further aspects related to co-existence and collaboration among different heterogeneous and autonomous components within a system, are in the scope of Collaborative CPS. These systems allow looking at the technical and organisational challenges from the perspective of interconnected and jointly acting entities. Such entities can be the physical devices or their virtual representations, which are called Digital Twins (DT), understood as digital replicas of physical assets. However, a DT provides more than just a digital simulation of the physical device or process, including reasoning and prediction mechanisms. This work is devoted to the discussion of how Digital Twins can be used in the design, development, and functioning of Collaborative CPS. As such, a design approach is suggested and illustrated with a smart home scenario.</p>

11. Performance Indicators of a Collaborative Business Ecosystem – A Simulation Study	
Authors	Paula Graça, Luis M. Camarinha-Matos

11. Performance Indicators of a Collaborative Business Ecosystem – A Simulation Study	
<b>Title</b>	Performance Indicators of a Collaborative Business Ecosystem – A Simulation Study
<b>Conference</b>	DoCEIS 2020 - 11th IFIP WG 5.5/SOCOLNET Advanced Doctoral Conference on Computing, Electrical and Industrial Systems
<b>References</b>	<a href="https://doi.org/10.1007/978-3-030-45124-0_1">https://doi.org/10.1007/978-3-030-45124-0_1</a>
<b>Date</b>	1-3 July 2020
<b>Place</b>	Costa de Caparica, Portugal
<b>Publication status</b>	Published
<b>Web</b>	<a href="https://link.springer.com/chapter/10.1007/978-3-030-45124-0_1">https://link.springer.com/chapter/10.1007/978-3-030-45124-0_1</a>
<b>Keywords</b>	Collaborative Networks, Collaborative Business Ecosystem, Performance indicators, Agent-based modelling, System dynamics
<b>Abstract</b>	<p>Collaborative Business Ecosystems have been benefiting from the technological advancements, allowing better collaboration among organisations to provide more innovative products and services in an increasingly demanding world. This collaboration can be assessed through a set of performance indicators, which also induce a self-adjustment of the organisations' behaviour, improving their profile and that of the ecosystem as a whole. In fact, their behaviour is expected to evolve (like individuals) according to the way they are evaluated. As such, this study presents a simulation model, which, together with the performance assessment and influence mechanism, is an essential contribution to measuring and influencing collaboration, enabling better management decisions. The model is based on agents and system dynamics, featuring a business ecosystem populated by organisations categorised according to a different profile, and configured and calibrated according to actual collaboration data. The samples were collected from two established companies operating in the same business ecosystem in the information technologies industry. Preliminary results of this approach, based on some simulation scenarios, are presented and discussed.</p>

12. Technological Innovation for Life Improvement	
<b>Authors</b>	Luis M. Camarinha-Matos, Nastaran Farhadi, Fábio Lopes, Helena Pereira
<b>Title</b>	Technological Innovation for Life Improvement, <b>Proceedings of DoCEIS 2020</b>
<b>Conference</b>	DoCEIS 2020 - 11th IFIP WG 5.5/SOCOLNET Advanced Doctoral Conference on Computing, Electrical and Industrial Systems
<b>References</b>	Springer <a href="https://doi.org/10.1007/978-3-030-45124-0">https://doi.org/10.1007/978-3-030-45124-0</a>
<b>Date</b>	1-3 Jul 2020
<b>Place</b>	Costa de Caparica, Portugal
<b>Publication status</b>	Published

12. Technological Innovation for Life Improvement	
<b>Web</b>	<a href="https://link.springer.com/book/10.1007/978-3-030-45124-0">https://link.springer.com/book/10.1007/978-3-030-45124-0</a>
<b>Keywords</b>	Collaborative systems, Decision and optimization systems, Communications systems, Digital twins and smart manufacturing, Energy systems, Biomedical systems, Instrumentation and health
<b>Abstract</b>	<p>Conference proceedings</p> 

13. AN ADOxx BASED ENVIRONMENT FOR PROBLEM BASED LEARNING IN MANUFACTURING SYSTEMS DESIGNS	
<b>Authors</b>	Ion Dan Mironescu
<b>Title</b>	AN ADOxx BASED ENVIRONMENT FOR PROBLEM BASED LEARNING IN MANUFACTURING SYSTEMS DESIGNS
<b>Conference</b>	The 9th International Conference on Manufacturing Science and Education - MSE 2019
<b>References</b>	MATEC Web Conf. 290 14003 (2019), <a href="https://doi.org/10.1051/mateconf/201929014003">https://doi.org/10.1051/mateconf/201929014003</a>
<b>Date</b>	5-7 June 2019
<b>Place</b>	Sibiu
<b>Publication status</b>	Published
<b>Web</b>	<a href="https://www.matec-conferences.org/articles/mateconf/abs/2019/39/mateconf_mse2019_14003/mateconf_mse2019_14003.html">https://www.matec-conferences.org/articles/mateconf/abs/2019/39/mateconf_mse2019_14003/mateconf_mse2019_14003.html</a>
<b>Keywords</b>	Manufacturing, Problem based learning
<b>Abstract</b>	The Problem Based Learning (PBL) as student centred approach and learning-by-doing method is suited for the modern higher education. However, the first contact with the method can be overwhelming for the students, in the absence of prior domain knowledge. The preparation of the learning material can be time

### 13. AN ADOxx BASED ENVIRONMENT FOR PROBLEM BASED LEARNING IN MANUFACTURING SYSTEMS DESIGNS

	<p>and resource consuming for the teacher. The goal of the research was the implementation of an environment that should enhance the learning experience for the student and reduce the implementation burden for the teacher. The environment is based on the ADOxx platform and allows the collaboration of the learner teams and the teacher-learner interaction on three levels. The Metamodeling level supports the development of the domain-specific language used in the modelling of the manufacturing system; this activity stimulates and directs the gathering and consolidation of domain-specific knowledge. The modelling level allows the development of alternative design solution using models of the factory components. The Simulation level allows the analysis of these variants. The environment supports the teacher in developing instructional scaffolding and uses cases to ease the learners the first time contact with PBL. The functionality of the environment is presented using the case of designing a flexible food production line.</p>
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### 14. DIGITAL DESIGN SKILLS FOR FACTORIES OF THE FUTURE

<b>Authors</b>	Adrian Florea
<b>Title</b>	DIGITAL DESIGN SKILLS FOR FACTORIES OF THE FUTURE
<b>Conference</b>	The 9th International Conference on Manufacturing Science and Education - MSE 2019
<b>References</b>	MATEC Web Conf. 290 14002 (2019), <a href="https://doi.org/10.1051/mateconf/201929014002">https://doi.org/10.1051/mateconf/201929014002</a>
<b>Date</b>	5-7 June 2019
<b>Place</b>	Sibiu
<b>Publication status</b>	Published
<b>Web</b>	<a href="https://www.matec-conferences.org/articles/mateconf/abs/2019/39/mateconf_mse2019_14002/mateconf_mse2019_14002.html">https://www.matec-conferences.org/articles/mateconf/abs/2019/39/mateconf_mse2019_14002/mateconf_mse2019_14002.html</a>
<b>Keywords</b>	Smart factory, Factory of the Future, Skills
<b>Abstract</b>	<p>Industry 4.0, Smart Manufacturing, Factories of the Future all describe aspects of the heralding era of digitalization of manufacturing aiming to interconnect every step of the manufacturing process and seamlessly integrate the physical and digital world. In Factories of the Future a central computer organizes the intelligent networking of all subsystems, suppliers and customers into one system. All relevant requirements concerning manufacturing and product are confirmed at design time, while execution takes place autonomously as ICT and automation are integrated. The main challenge is represented by educational system, how prepared is to provide students, future employees, the digital competences necessary for the Factories of the Future. What are the structural and curricular measures Higher Education Institutions need to take in order to align engineering</p>



14. DIGITAL DESIGN SKILLS FOR FACTORIES OF THE FUTURE	
	education, especially in the design of all constituents of Factories of the Future, with the need of competences in new manufacturing era? A quantitative analysis of existing study programs aims understanding the status quo of Master programs in engineering education and, deriving from existing policy documents potential requirements for competences design of Factory of the Future employees.
15. MM-DSL, SUPPORT FOR IMPLEMENTING MODELING TOOLS FOR MANUFACTURING PROCESSES	
<b>Authors</b>	Daniel-Cristian Crăciunean, Daniel Volovici
<b>Title</b>	MM-DSL, SUPPORT FOR IMPLEMENTING MODELING TOOLS FOR MANUFACTURING PROCESSES
<b>Conference</b>	The 9th International Conference on Manufacturing Science and Education - MSE 2019
<b>References</b>	MATEC Web Conf. 290 14001 (2019), <a href="https://doi.org/10.1051/mateconf/201929014001">https://doi.org/10.1051/mateconf/201929014001</a>
<b>Date</b>	5-7 June 2019
<b>Place</b>	Sibiu
<b>Publication status</b>	Published
<b>Web</b>	<a href="https://www.matec-conferences.org/articles/mateconf/abs/2019/39/mateconf_mse2019_14001/mateconf_mse2019_14001.html">https://www.matec-conferences.org/articles/mateconf/abs/2019/39/mateconf_mse2019_14001/mateconf_mse2019_14001.html</a>
<b>Keywords</b>	Manufacturing process, Factory of the Future, Modelling tools
<b>Abstract</b>	Today's competitive conditions call for detailed comparative analyzes of manufacturing processes in order to get competitive products. This analysis involves the development of faithful and robust models for the supervision and management of all organizational and operational activities of companies. Efficient modelling involves the selection and use of appropriate tools for modelling, simulation and analysis of manufacturing processes. The diversity of manufacturing processes often makes it necessary to implement specific modelling tools. MM-DSL is a platform independent language for specifying and implementing specific modelling tools. The core objective of the MM-DSL language is the implementation of the modelling method concept. The paper presents the mechanisms underlying the MM-DSL language as well as its use for building the modelling tools specific to the manufacturing systems.

### 3 Project White Papers

The project's partners will collaborately produce one White Paper. The details of this paper is presented here.

<b>DigiFoF White Paper: Methodology and Tools for the Design of a Digital Factory of the Future</b>	
<b>Authors</b>	Adrian Florea, Ion Mironescu, Damiel Morariu, Daniel Volovici, Remus Brad
<b>Title</b>	Methodology and Tools for the Design of a Digital Factory of the Future
<b>References</b>	IEC White Paper: Factory of the future, <a href="https://www.iec.ch/whitepaper/pdf/iecWP-futurefactory-LR-en.pdf">https://www.iec.ch/whitepaper/pdf/iecWP-futurefactory-LR-en.pdf</a> retrieved 20.07.2019 Frechette, S. Model Based Enterprise for Manufacturing. NIST. National Institute of Standards and Technology, 2011 Pietruszewicz, K. Metamodelling for Design of Mechatronic and Cyber-Physical Systems. Applied Science 2019, 9(3), 376
<b>Date</b>	January 2021
<b>Publication status</b>	Started and create the technical report
<b>Web</b>	Technical report for the White Paper is <a href="https://cloud.digifof.ulbsibiu.ro/remote.php/webdav/DigiFoF%20Project/Deliverables/WP3/D3.3%20Design%20method%20for%20the%20Factory%20of%20the%20Future_review_OMiLAB_M15.pdf">https://cloud.digifof.ulbsibiu.ro/remote.php/webdav/DigiFoF%20Project/Deliverables/WP3/D3.3%20Design%20method%20for%20the%20Factory%20of%20the%20Future_review_OMiLAB_M15.pdf</a>
<b>Keywords</b>	Enterprise Architecture, Model Based Enterprise, Reference Enterprise Architecture, Model Based System Engineering, ADOxx
<b>Abstract</b>	<p>This white paper presents the reasons for and the details of a new design methodology for the Factory of the Future (FoF), methodology that will be developed in the frame of DigiFoF project. The introduction presents the challenges and the state of the art in designing the FoF.</p> <p>In the First part presents the methodology. It starts with the particularities of the chosen Enterprise Architecture (EA) – Model Based Enterprise (MBE). A MBE is an enterprise that uses models of its products and processes to define, execute, control, and manage all its processes. The models are the core data repositories used for the integration and management of the technical and business processes. The models allows the use of simulation and analysis tools on each step of the product lifecycle. This makes possible a sustainable manufacturing through waste, stocks and energy reduction.</p> <p>The choice of the design method is then presented. The most suited is in this case Model Based Systems Engineering. Due to the complexity of the System of (Cyber physical) Systems that is the FoF, the design process needs a structured approach based on a reference EA (REA) (e.g. Reference Architectural Model Industrie 4.0). The developed models will be then used as the digital twins of</p>

DigiFoF White Paper: Methodology and Tools for the Design of a Digital Factory of the Future	
	<p>their real counterparts. They will gather and share data about the current state of the factory. This data can be then used as initial data for simulation and as input for the decision support system.</p> <p>The second part presents the support tools that will be developed for the methodology. The EA should evolve with the configuration changes, development and reengineering of the digital FoF. An environment that support de development, instantiation, deployment and simulation of the models will be provided. The metamodeling, modeling and simulation tools of the ADOxx platform will be used to develop domain specific languages, model repositories, editors and browser for each level of the REA. The corresponding web services used to implement the model based data gathering infrastructure will be also generated using the ADOxx tools. Executable models for simulation will be automatically generated for the corresponding discrete event simulators.</p>

## 4 Press and Network Dissemination

Press and network disseminations are the Project representation in less oficial formats such as web pages, catalogues or flyers. A general list of these kind of disseminations per country are presented here and later in each sub-sections more details are provided.

Partners	Press and network dissemination
<b>Austria</b>	Not any dissemination yet (2020/06/30)
<b>France</b>	<ol style="list-style-type: none"> <li>1. Project DigiFoF: Expertise of Mines Saint-Etienne at service in FoF</li> <li>2. Digital transformation and circular economy: complementary levers for innovation</li> <li>3. Servicisation des produits : vers une économie créatrice de valeur</li> </ol>
<b>Germany</b>	DigiFoF Details project details and summary is available online on the community page of OMILAB ( <a href="https://www.omilab.org/activities/digifof.html">https://www.omilab.org/activities/digifof.html</a> ), accessible for the general public, and specifically the supported community.
<b>Italy</b>	Not any dissemination yet (2019/07/31)
<b>Poland</b>	<p><b><u>Digital Design Skills for Factories of the Future</u></b> Website information, <a href="http://www.amp2.pl/">http://www.amp2.pl/</a></p> <p><b><u>Project DigiFoF</u></b> Website information, <a href="https://wiz.pb.edu.pl/2019/01/04/nowy-miedzynarodowy-projekt-badawczy/">https://wiz.pb.edu.pl/2019/01/04/nowy-miedzynarodowy-projekt-badawczy/</a></p>

Partners	Press and network dissemination
	<p><b>Regional competition:</b>  <a href="https://podlaskamarka.pl/zgloszenie/projekt-digifof-digital-design-skills-for-factories-of-the-future/">https://podlaskamarka.pl/zgloszenie/projekt-digifof-digital-design-skills-for-factories-of-the-future/</a></p> <p><b>Kurier Poranny</b>  <a href="https://poranny.pl/podlaska-marka-2019-ponad-200-zgloszen-w-xvi-edycji-nagrody-wsrod-zgloszen-trawa-pigwoniada-woda-miejska-pelna-lista/ar/c1-14745094">https://poranny.pl/podlaska-marka-2019-ponad-200-zgloszen-w-xvi-edycji-nagrody-wsrod-zgloszen-trawa-pigwoniada-woda-miejska-pelna-lista/ar/c1-14745094</a></p> <p><b>Regional media:</b>            Podlaski Manager, April 2020, p. 16-17  <a href="https://iph.bialystok.pl/wp-content/uploads/2020/03/PM_197_kwiecien_2020_online.pdf">https://iph.bialystok.pl/wp-content/uploads/2020/03/PM_197_kwiecien_2020_online.pdf</a></p>
Portugal	<ol style="list-style-type: none"> <li>1. DIGIFOF - short summary</li> <li>2. DIGIFOF : THE FOF DESIGNER: DIGITAL DESIGN SKILLS</li> <li>3. FOR FACTORIES OF THE FUTURE</li> </ol>
Romania	<p>“15 universities and companies from abroad help students develop new skills”, Tribuna Sibiului Newspaper,  <a href="http://www.tribuna.ro/stiri/eveniment/15-universitati-si-companii-din-strainatate-ii-ajuta-pe-studenti-sa-isi-dezvolte-competente-noi-141234.html">http://www.tribuna.ro/stiri/eveniment/15-universitati-si-companii-din-strainatate-ii-ajuta-pe-studenti-sa-isi-dezvolte-competente-noi-141234.html</a></p>

#### 4.1 Dissemination Articles in Austria

Not any dissemination yet (2020/06/30)

Projet DigiFoF : ?	
Authors	
Title	
Dissemination support	
Target group	
Date	
Web	
Abstract	

#### 4.2 Dissemination Articles in France

Disseminations in France will be represented in two different forms. The first one is a web dissemination and the second one is in the form of the project flyers.

1. Web dissemination

<b>Projet DigiFoF : Mines Saint-Étienne's expertise at the service of the industry of the future</b>	
<b>Authors</b>	Mines Saint Etienne
<b>Title</b>	Projet DigiFoF : l'expertise de Mines Saint-Étienne au service de l'industrie du futur
<b>Dissemination support</b>	Web and social media, Facebook, Twitter, External dissemination network of mines Saint Etienne
<b>Target group</b>	Industrial and academic partners
<b>Date</b>	May 2019
<b>Web</b>	<a href="https://www.mines-stetienne.fr/Projet_DiGiFoF">https://www.mines-stetienne.fr/Projet_DiGiFoF</a>
<b>Abstract</b>	Article explaining the objectives, structuration, key partners and key actions developed during DIOGIFoF Project.

<b>IMT Tech - Servicisation of products : towards a value creating economy</b>	
<b>Authors</b>	Mines Saint Etienne
<b>Title</b>	Servicisation of products : towards a value creating economy Servicisation des produits : vers une économie créatrice de valeur
<b>Dissemination support</b>	IMT Tech (international IMT New letter), Web and social media, Facebook, Twitter, External dissemination network of mines Saint Etienne
<b>Target group</b>	Industrial and academic partners
<b>Date</b>	September 2019
<b>Web</b>	<a href="https://blogrecherche.wp.imt.fr/en/2019/11/15/servitization-of-products-towards-a-value-creating-economy/">https://blogrecherche.wp.imt.fr/en/2019/11/15/servitization-of-products-towards-a-value-creating-economy/</a>
<b>Abstract</b>	Article explaining the economic impact of developing industrial business models based on servitization.

<b>Projet DigiFoF : ?</b>	
<b>Authors</b>	CIRRID
<b>Title</b>	
<b>Dissemination support</b>	
<b>Target group</b>	
<b>Date</b>	
<b>Web</b>	<a href="https://www.economiecirculaire.org/articles/e/webinaire-economie-circulaire-et-industrie-du-futur.html">https://www.economiecirculaire.org/articles/e/webinaire-economie-circulaire-et-industrie-du-futur.html</a>
<b>Abstract</b>	

<b>Projet DigiFoF : ?</b>	
<b>Authors</b>	CIRRID

Projet DigiFoF : ?	
Title	
Dissemination support	
Target group	
Date	
Web	<a href="https://www.eclaira.org/articles/#page1">https://www.eclaira.org/articles/#page1</a>
Abstract	

## 2. Dissemination of DigiFoF flyers

Digital transformation and circular economy: complementary levers to innovate	
Authors	Mines Saint Etienne
Title	Transformation numérique et économie circulaire: des leviers complémentaires pour innover
Dissemination support	Dissemination of 100 DigiFoF Flyer (paper prints) on the occasion of a dissemination workshop
Target group	Industrial and socio-economics network
Date	22 May 2019
Web	<a href="https://www.mines-stetienne.fr/recherche/5-centres-de-formation-et-de-recherche/institut-henri-fayol/actualites/journee-defii-de-linstitut-henri-fayol-2019/">https://www.mines-stetienne.fr/recherche/5-centres-de-formation-et-de-recherche/institut-henri-fayol/actualites/journee-defii-de-linstitut-henri-fayol-2019/</a>
Abstract	Networking and dissemination workshop dedicated to the digital transformation of the industry

## 4.3 Dissemination Articles in Germany

Regionale Anwedertreffen der BOC 2020	
Authors	OMILAB NPO
Title	Regionale Anwendertreffen 2020 (5x : 1 presence, 4 virtual)
Dissemination support	Dissemination of localized DigiFoF Flyer (paper prints) during the event, introduction of DigiFoF during the virtual meetings. Presentation slot during the event
Target group	Industrial users
Date	5.3.2020, 18.03.2020, 01.04.2020, 29.04.2020, 13.05.2020
Web	<a href="https://de.boc-group.com/nc/events/event/article/regionales-anwendertreffen-der-boc-in-muenchen/">https://de.boc-group.com/nc/events/event/article/regionales-anwendertreffen-der-boc-in-muenchen/</a>
Abstract	BOC Innovation Lab: Design Thinking Workshop powered by OMiLAB

DigiFoF Project	
Authors	OMILAB NPO

<b>DigiFoF Project</b>	
<b>Title</b>	DigiFoF: Digital Design Skills for Factories of the Future
<b>Dissemination support</b>	Web page
<b>Target group</b>	Industrial, academic partners and community members
<b>Date</b>	May 2019
<b>Web</b>	<a href="https://www.omilab.org/activities/digifof.html">https://www.omilab.org/activities/digifof.html</a>
<b>Abstract</b>	Project summary and interaction channel for interested parties.

#### 4.4 Dissemination Articles in Italy

<b>Projet DigiFoF : Skills needed to design the factory of the future</b>	
<b>Authors</b>	Fabiana Pirola, Andrea Mazzoleni, Giuditta Pezzotta
<b>Title</b>	Le Competenze per la Progettazione della Fabbrica del Futuro
<b>Dissemination support</b>	Italian journal Sistemi&Impresa
<b>Target group</b>	Companies, researchers
<b>Date</b>	May 2020
<b>Web</b>	
<b>Abstract</b>	<p>This article provides some indications aimed at providing a greater understanding of the issues concerning the transition of companies towards the Factory of the Future paradigm, with particular attention to the issues concerning the new skills that are increasingly necessary to better manage and design the introduction of advanced production technologies.</p> <p>The results, based on a survey conducted within the Erasmus + KA2 DigiFoF project - The FOF-designer: Digital design skills for factories of the future - on a sample of 87 companies among them belonging to 6 European countries, suggest that the need for skills, both in terms of updating existing skills and generating new skills, represents one of the key aspects to be considered when designing a FoF.</p>

#### 4.5 Dissemination Articles in Poland

1. Web dissemination

<b>Digital Design Skills for Factories of the Future</b>	
<b>Authors</b>	Arkadiusz Jurczuk
<b>Title</b>	Digital Design Skills for Factories of the Future
<b>Dissemination support</b>	Web media
<b>Target group</b>	Students, employees, industrial and academic partners

Digital Design Skills for Factories of the Future	
<b>Date</b>	15-06-2019 04-01-2019
<b>Web</b>	Website information, <a href="https://wiz.pb.edu.pl/2019/01/04/nowy-miedzynarodowy-projekt-badawczy/">https://wiz.pb.edu.pl/2019/01/04/nowy-miedzynarodowy-projekt-badawczy/</a> (in Polish) Website information, <a href="http://www.amp2.pl/">http://www.amp2.pl/</a>
<b>Abstract</b>	Information about the objectives, key partners and key actions of DigiFoF project

## 2. Dissemination of DigiFoF posters

Digital Design Skills for Factories of the Future	
<b>Authors</b>	Arkadiusz Jurczuk, Beata Weremijewicz, Bialystok University of Technology
<b>Title</b>	Digital Design Skills for Factories of the Future
<b>Dissemination support</b>	Dissemination of 10 DigiFoF posters (paper version) – campus of Bialystok University of Technology
<b>Target group</b>	Students, employees, industrial and academic partners
<b>Date</b>	May 2019
<b>Web</b>	paper version
<b>Abstract</b>	DigiFoF poster explaining the objectives, key partners and key actions

Podlaska Brand (category: Project 4.0)	
<b>Authors</b>	Bialystok University of Technology/Metal Processing Cluster (Innovation and Development Promotion Centre)
<b>Title</b>	Podlaska Brand (category: Project 4.0) The Podlaska Brand of the Year Prize Competition The Podlaskie Voivodeship Marshal's Office
<b>Dissemination support</b>	Local press, regional media/web media
<b>Target group</b>	Local society
<b>Date</b>	2020 In progress
<b>Web</b>	Website information: <a href="https://podlaskamarka.pl/">https://podlaskamarka.pl/</a> Media: <a href="https://poranny.pl/w-xvi-edycji-konkursu-podlaska-marka-2019-wplynelo-ponad-200-zgloszen/ar/c3-14748988">https://poranny.pl/w-xvi-edycji-konkursu-podlaska-marka-2019-wplynelo-ponad-200-zgloszen/ar/c3-14748988</a>
<b>Abstract</b>	16 <sup>th</sup> Edition of the The Podlaska Brand of the Year Prize Competition DigiFoF project has been presented as an example of innovative approach to competency designing for Industry 4.0. Competition's application presents: information about the objectives of the DIGIFoF project, key outputs and key actions of DigiFoF project



#### 4.6 Dissemination Articles in Portugal

DIGIFOF - short summary	
Authors	SOCOLNET
Title	DIGIFOF - short summary
Dissemination support	SOCOLNET Newsletter Nº 20
Target group	Community of Collaborative Networks researchers
Date	July 2019
Web	<a href="https://docs.google.com/a/uninova.pt/viewer?a=v&amp;pid=sites&amp;srcid=dW5pbm92YS5wdHxzb2NvbG5ldHxneDo3YWZlNTUxYWIwY2I1MWEEx">https://docs.google.com/a/uninova.pt/viewer?a=v&amp;pid=sites&amp;srcid=dW5pbm92YS5wdHxzb2NvbG5ldHxneDo3YWZlNTUxYWIwY2I1MWEEx</a> and <a href="http://codis.uninova.pt/socolnet/pages/services/">http://codis.uninova.pt/socolnet/pages/services/</a>
Abstract	Brief summary of the DigiFoF project.

DIGIFOF - short summary	
Authors	SOCOLNET
Title	DIGIFOF - THE FOF DESIGNER: DIGITAL DESIGN SKILLS FOR FACTORIES OF THE FUTURE
Dissemination support	SOCOLNET Newsletter Nº 21
Target group	Community of Collaborative Networks researchers
Date	October 2019
Web	<a href="https://docs.google.com/a/uninova.pt/viewer?a=v&amp;pid=sites&amp;srcid=dW5pbm92YS5wdHxzb2NvbG5ldHxneDoyZGVhOTE2MWI3MmUwY2Ew">https://docs.google.com/a/uninova.pt/viewer?a=v&amp;pid=sites&amp;srcid=dW5pbm92YS5wdHxzb2NvbG5ldHxneDoyZGVhOTE2MWI3MmUwY2Ew</a> and <a href="http://codis.uninova.pt/socolnet/pages/services/">http://codis.uninova.pt/socolnet/pages/services/</a>
Abstract	Brief summary of the DigiFoF project and related recent news.

#### 4.7 Dissemination Articles in Romania

15 universities and companies from abroad help students develop new skills	
Authors	
Title	15 universities and companies from abroad help students develop new skills
Dissemination support	Tribuna Sibiului Newspaper
Target group	
Date	

<b>15 universities and companies from abroad help students develop new skills</b>	
<b>Web</b>	<a href="http://www.tribuna.ro/stiri/eveniment/15-universitati-si-companii-din-strainatate-ii-ajuta-pe-studenti-sa-isi-dezvolte-competente-noi-141234.html">http://www.tribuna.ro/stiri/eveniment/15-universitati-si-companii-din-strainatate-ii-ajuta-pe-studenti-sa-isi-dezvolte-competente-noi-141234.html</a>
<b>Abstract</b>	

<b>DigiFoF and OMiLAB Sibiu presentation</b>	
<b>Authors</b>	Adrian Florea
<b>Title</b>	Digital Design Skills for the Factory of the Future
<b>Dissemination support</b>	Face-to-face presentation
<b>Target group</b>	32 rectors and deans from Cambodian Universities
<b>Date</b>	11-12 February 2020
<b>Web</b>	<a href="http://digifof.omilab.ulbsibiu.ro/psm/home">http://digifof.omilab.ulbsibiu.ro/psm/home</a>
<b>Abstract</b>	

<b>Web training material promote: Artificial Intelligence for Facial and Emotion Recognition</b>	
<b>Authors</b>	Adrian Florea, Ioana Cofaru, Daniel Morariu
<b>Title</b>	Artificial Intelligence for Facial and Emotion Recognition
<b>Dissemination support</b>	Digital Innovation Hub - Smart, Safe and Sustainable Society Cluj IT cluster <a href="https://www.clujit.ro/">https://www.clujit.ro/</a>
<b>Target group</b>	people interested in Industry 4.0 technologies
<b>Date</b>	2020
<b>Web</b>	<a href="https://www.dih4society.ro/repository-and-resources/training-and-education">https://www.dih4society.ro/repository-and-resources/training-and-education</a>
<b>Abstract</b>	

<b>Web training material promote: Artificial Smart City Modelling</b>	
<b>Authors</b>	Adrian Florea, Ioana Cofaru, Daniel Morariu
<b>Title</b>	Smart City Modelling
<b>Dissemination support</b>	Digital Innovation Hub - Smart, Safe and Sustainable Society Cluj IT cluster <a href="https://www.clujit.ro/">https://www.clujit.ro/</a>
<b>Target group</b>	Municipalities and people interested in Industry 4.0 technologies
<b>Date</b>	2020
<b>Web</b>	<a href="https://www.dih4society.ro/repository-and-resources/training-and-education">https://www.dih4society.ro/repository-and-resources/training-and-education</a>
<b>Abstract</b>	

<b>Web training material promote: Artificial Introduction to Flexible Manufacturing Systems</b>	
<b>Authors</b>	Adrian Florea, Ioana Cofaru, Daniel Morariu
<b>Title</b>	Introduction to Flexible Manufacturing Systems
<b>Dissemination support</b>	Digital Innovation Hub - Smart, Safe and Sustainable Society Cluj IT cluster <a href="https://www.clujit.ro/">https://www.clujit.ro/</a>
<b>Target group</b>	people interested in Industry 4.0 technologies for creative engineering, municipality, decision factors, agencies
<b>Date</b>	2020
<b>Web</b>	<a href="https://www.dih4society.ro/repository-and-resources/training-and-education">https://www.dih4society.ro/repository-and-resources/training-and-education</a>
<b>Abstract</b>	

<b>Info Session for Conti Students: Workplace Safety – Face emotion recognition</b>	
<b>Authors</b>	Adrian Florea, Valentin Fleacă, Cristian Mișuțoiu
<b>Title</b>	Info Session for Conti Students: Workplace Safety – Face emotion recognition
<b>Dissemination support</b>	Online presentation and discussions
<b>Target group</b>	57 students + 4 professors
<b>Date</b>	28.05.2020
<b>Web</b>	<a href="https://teams.microsoft.com/l/meetup-join/19%3ameeting_NGZkMThlZWYtYzI3MS00YTU5LWlyNGItNWY3ZTE1M2ZmNjU2%40thread.v2/0?context=%7b%22Tid%22%3a%228d4b558f-7b2e-40ba-ad1f-e04d79e6265a%22%2c%22Oid%22%3a%22172901eb-6145-4c8a-946a-e7ae681ffaba%22%7d">https://teams.microsoft.com/l/meetup-join/19%3ameeting_NGZkMThlZWYtYzI3MS00YTU5LWlyNGItNWY3ZTE1M2ZmNjU2%40thread.v2/0?context=%7b%22Tid%22%3a%228d4b558f-7b2e-40ba-ad1f-e04d79e6265a%22%2c%22Oid%22%3a%22172901eb-6145-4c8a-946a-e7ae681ffaba%22%7d</a>
<b>Abstract</b>	

## 5 Conclusions

This first version of deliverable 8.3 is an initial document which provides the details of the academic disseminations produced or planned to be produced in DigiFoF project. This deliverable is meant to be updated during the project as more dissemination materials are produced.

This list will be also updated on the project website at the following address.

<https://www.digifof.eu/>