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

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DigiFoF

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Project Coordinator:

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EMSE, UNIBG, UNIOULU, UNIBIAL, BOC,
CONTI, CLEX, OMiLAB

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[1] "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."

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1 Introduction

This report details the actions carried out by DigiFoF partners from joint academia-industry point of view in the first year of DigiFoF project. The evaluated actions were proposed and described in detailed in the D5.1 deliverable (Action plan on joint academia-industry initiatives).
DIGIFoF partners carried out all planned actions proposed in the action plan. Information about these activities taken in the period 01.2019-10.2021 (34 month) are given in details in the next section of the report. It contains a separated section for each national note of academic/industrial partnerships, with actions that was taken in the covered period regarding collaborations between academy and industry in the DigiFoF project.

2 EMSE&CLEXTRAL: List of joint academia-industry actions

2.1 Online and face-to-face trainings and Webinar

2.1.1 Actions provided by EMSE

EMSE contributes to the following two webinars in 2019, 2020 and 2021. The second webinar on 12.02.2020 is realize in collaboration with CIRIDD.

Table 2.1. EMSE online and face-to-face trainings and Webinar

Training/webinar topic	DIGIFoF Contributors	Date	Qualitative results
DigiFoF webinar #2 - Introduction and research interest of each Laboratory	Xavier Boucher, EMSE	07.10.2019	Information available on the web.
DigiFoF webinar #9: Circular Economy approach in servitization	Coralie Neyrand, CIRRID Nadine Dubruc, EMSE	12.02.2020	Information available on the web, and reusable for teaching purposes.
French DigiFoF Webinar Industrie du futur: comment associer la personnalisation de masse et l'agilité des systèmes de production ?	Khaled Medini EMSE Xavier Delorme EMSE Arnaud Bocquillon CIMES	12.06.2020	Material and video reusable for industrial training, available on the web via French partners (CIMES and other websites)
DigiFoF Webinar #15 Convergence between mass-customisation and industrial agility	Xavier Boucher EMSE Khaled Medini EMSE Xavier Delorme EMSE Arnaud Bocquillon CIMES	08.09.2020	Information available on the web, and reusable for teaching purposes.
DigiFoF Webinar #23 Multidimensional impacts of Service oriented strategies and Functional Economy	Amandine Ameline, CIRIDD Nicolas Frango, CIRIDD Arnaud Bocquillon, CIMES Nadine Dubruc, EMSE	30.09.2021	Material and video reusable for industrial training, available on the web via French partners (CIMES and other websites)

2.2 Lectures (series) in academia and industry

2.2.1 Actions provided by EMSE

Ecole Nationale Supérieure des Mines de Saint Etienne (EMSE) provides the following lectures in academia. These lectures target engineering students from different disciplines to make them familiar with various aspect of FOF.

Table 2.2. EMSE lectures (series) in academia and industry

Lectures topic	Lecturer / Participant	Date	Participants	Qualitative results
Security and health management for Digital FoF	Nadine Dubruc	April 2019	6	Awareness of occupational health and safety as part of organizational change
NEMO 2019	Xavier Boucher	July 2019	50	Knowledge transfer re-used by PhD students; practical exercices re-used for other teaching purposes
Industry 4.0 in master MIT	Elaine Mosconi	October 2019	10	Development of industrial & academic international collaborations on industry 4.0

Lectures topic	Lecturer / Participant	Date	Participants	Qualitative results
Business process management using OMiLAB	Xavier Boucher	October 2019	28	Teachings programmed yearly. Internships on BPR proposed to students.
PSS design in industrial transition	Xavier Boucher	November 2019	13	Teachings programmed yearly. Proposal of specific industry 4.0 projects to students.
Life-cycle integration and management	Xavier Boucher	November 2019	6	Teachings programmed yearly.
Enterprise modelling and design using OMiLAB	Xavier Boucher	December 2019	4	Teachings programmed yearly. Later use of OMILAB by students in research activities.
Operationalizing Circular Economy by means of Product-Service System (PSS)	Elaheh Maleki	February 2020	15	This program made engineering students familiar with circular servitization in industry. Canceled because of covid 19
Security and health management for Digital FoF	Nadine Dubruc	April 2020	6	Awareness of occupational health and safety as part of organizational change
Business process management using OMiLAB	Xavier Boucher	November 2020	43	Teachings programmed yearly (ICM – GPL Students). Internships on BPR proposed to students.
PSS design in industrial transition	Xavier Boucher	October 2020	16	Teachings programmed yearly (ICM – LMRI Students). Proposal of specific industry 4.0 projects to students.
Life-cycle integration and management	Xavier Boucher	December 202	7	Teachings programmed yearly (Master MTI).
Enterprise modelling and design using OMiLAB and ADOXX	Khaled Medini	December 2020	4	Teachings programmed yearly. Later use of OMILAB by students in research activities.
Enterprise modelling and design using OMiLAB	Xavier Boucher	December 2020	4	Teachings programmed yearly. Later use of OMILAB by students in research activities.
Security and health management for Digital FoF	Nadine Dubruc	July 2021	6	Awareness of occupational health and safety as part of organizational change
NEMO DAYS'2021	Xavier Boucher	April 2021	>70	Knowledge transfer re-used by Master, PhD students and industrial attendees, on product-service strategies for FoF.
NEMO 2021	Xavier Boucher	July 2021	>200	Knowledge transfer re-used by PhD students; practical exercices re-used for other teaching purposes
Business process management using OMiLAB	Xavier Boucher	November 2021	30	Teachings programmed yearly (ICM – GPL Students). Internships on BPR proposed to students.
PSS design in industrial transition	Xavier Boucher	October 2021	21	Teachings programmed yearly (ICM – LMRI Students). Proposal of specific industry 4.0 projects to students.
Life-cycle integration and management	Xavier Boucher	December 2021	21	Teachings programmed yearly (Master MTI).
Enterprise modelling and design using OMiLAB	Xavier Boucher	December 2021	~10	Teachings programmed yearly. Later use of OMILAB by students in research activities.
Enterprise modelling and design using OMiLAB and ADOXX	Khaled Medini	December 2021	~10	Teachings programmed yearly. Later use of OMILAB by students in research activities.

2.2.2 Actions provided by Clextral

Clextral is actively in collaboration with EMSE in realizing knowledge exchange between industry-academia. In 2019, 2020 and 2021, Clextral gave the following lectures in EMSE.

Table 2.3. Clextral lectures (series) in academia

Lectures topic	Lecturer / Participant	Date	Participants	Qualitative results
International Management	Gilles Maller	April 2019	24	Transfer of industrial expertise towards engineering students- Yearly teaching.
International Strategy	Gilles Maller	May 2019	24	Transfer of industrial expertise towards engineering students Yearly teaching.
International Management	Gilles Maller	April 2020	24	Transfer of industrial expertise towards engineering students- Yearly teaching.
International Strategy	Gilles Maller	May 2020	24	Transfer of industrial expertise towards engineering students- Yearly teaching.
International Management	Gilles Maller	April 2021	21	Transfer of industrial expertise towards engineering students- Yearly teaching.
International Strategy	Gilles Maller	May 2021	21	Transfer of industrial expertise towards engineering students- Yearly teaching.

2.3 Invited talks both in academic and industrial settings

2.3.1 Actions provided by EMSE

EMSE continuously invites professionals from different research institute and industrial companies to discuss on various subjects. However the year 2020 was quite impacted by the COVID situation, with cancellation of several events. The following talks are organized.

Table 2.4. Invited talks both in academic and industrial settings

Topic	Presenter	Date	Participants	Qualitative results
Digital transformation and circular Economy	PRIMETAL, Y.Fontaine (FR)	May 2019	50	Mutual exchanges between academic and industrial, on digital orientations for industry of the future
Digital transformation and circular Economy	EPE, C. Tutenuit (FR)	May 2019	50	Mutual exchanges between academic and industrial, on digital innovation for circular economy
Industry 4.0	Sherbrooke university (CAN)	October 2019	10	International Exchange of expertise on industry of the future

Topic	Presenter	Date	Participants	Qualitative results
PSS and sustainability	ECOBEL, JP.Bosles (FR)	October 2019	25	Transfer of industrial expertise towards engineering students
Management of Product-Services Strategies	BIELIEFELD University (DE)	February 2020	8	International exchange of expertise on industry of the future. Professional training for students.
Sustainability and Service-oriented Strategies	ECOBEL, JP.Bosles (FR)	October 2020	17	Transfer of industrial expertise towards engineering students
Reactive planification and control of supply Chain	B2WISE F.PICANO (FR)	October 2020 (On distance)	43	Transfer of industrial expertise towards engineering students
Data Warehouse Management and optimisation	MANHATTAN ASSOCIATES (FR)	October 2020 (On distance)	43	Transfer of industrial expertise towards engineering students
Management of Product-Services Strategies	BIELEFELD University (DE)	February 2021 (On distance)	4	International exchange of expertise on industry of the future. Professional training for students.
Reactive planification and control of supply Chain	B2WISE F.PICANO (FR)	October 2021	30	Transfer of industrial expertise towards engineering students
Data Warehouse Management and optimisation	MANHATTAN ASSOCIATES (FR)	October 2021	43	Transfer of industrial expertise towards engineering students
Industrial Workshop on Collaborative Networks 4.0	Elm Leblanc F.Vuilaume (FR) THALES JL. Garnier (FR) TETRA-PAK C.Leardi (IT)	Novemb er 2021)	90	Dedicated International Workshop on industry of the future, for academic and industrial collaborations. Workshop open both to industrial and PhD/Master student participation.

2.4 Internships (e.g. Erasmus+ / student internships)

2.4.1 Actions provided by EMSE

EMSE supports student internship and provides trainings for Erasmus+. In the context of Erasmus+, EMSE organize courses focusing on different aspects of Product-Service System (PSS)

Table 2.5. European Erasmus+ transfers of expertise (Teachers exchanges)

Erasmus+						
Teacher Name	**Specialization**	**Year study**	**Start date**	**Organising Company**	**Participants**	**Qualitative results**
Xavier Boucher	PSS design	PhD	July 2019	University of Vienna	50	Transfer of expertise on PSS Design
Thomas Suesse	PSS management	Final year of Master	February 2020	EMSE	15	Transfer of expertise on PSS management
Thomas Suesse	PSS management	Final year of Master	January 2021	EMSE	8	Transfer of expertise on PSS management
Xavier Boucher	Environmental assessment of PSS	Master I	January 2021	EMSE	20	Erasmus+ Semestrial Exchange

Table 2.6. Internships provided by EMSE for students

Student internships					
Student Name	**Specialization**	**Year study**	**Start date**	**Organising Company**	**Qualitative results**
Roua Allaoui	Data analysis for industrial and commercial strategy	Master II	May 2019	Clextral	Report on the status and history of different machines.
Thibault Gourdon	Studying the market of second hand extrusion machine	Master II	Oct. 2019	Clextral	Report on the status and history of second-hand machines.
Elisabetta Arboscelli	Smart PSS design	Master I	January 2021	Elm Leblanc	Contribution to a design method
Abir Belcaid	PSS project management	Master I	Oct. 2019	CETIM	Audit for PSS innovation projects
Abir Belcaid	PSS project management	Master II	Feb. 2019	ERE 43	Economic model for PSS assessment method
Bruno Mokbel	Servitisation of manufacturing Systems	Master I	Feb. 2019	EMSE	Method for production system reconfiguration
Constantin ROUSSEAU	Digitalisation of manufacturing Systems	Master I	Feb. 2019	EMSE	Method for production system reconfiguration
Jean Philippe Vouhé	Reconfigurability of manufacturing Systems	Master I	Feb. 2020	EMSE	FRAMEWORK FOR RECONFIGURABLE MANUFACTURING SYSTEMS DECISION-MAKING

Marghrita DIB	Management of Circular Economy for industry of the future	Master I	Oct. 2020	Clextral	Industrial management of product renovation processes
Julien BECOT	Commercial offers for second-hand Machinery	Master I	Oct. 2020	Clextral	Innovation and marketing strategy for product renovation
Mouhammad Fawaz	Human resources and empowerment	Master II	Nov. 2020	EMSE	Report on HR tools encouraging empowerment
Alexis Guerin	Reactive Supply Chain Management	Master I	Oct. 2020	B2WISE	Simulation of supply Chain
Mayeul Arnaud Des Lyons	Reactive Supply Chain Management	Master I	Oct. 2020	B2WISE	Indicators for supply Chain mamagement
Marghrita DIB	Implementation of an industrial renovation process and service.	Master I	Feb. 2021	Clextral	Industrial management of product renovation processes
Mayeul Arnaud Des Lyons	Reactive Supply Chain Management	Master I	Feb. 2021	B2WISE	Supply Chain modelling and optimisation
Mariza Maliqi	Sustainable Smart PSS design	Master II	March 2021	Elm Leblanc	Contribution to a smart PSS design method
Zixing Liu	Upgradability for smart PSS	Master I	Feb. 2021	FAYOL Laboratory	Upgradability in industrial PSS Offers
Teresa Avellan	Upgradability for smart PSS	Master I	Feb. 2021	FAYOL Laboratory	Upgradability in industrial PSS Offers
Mayeul Arnaud Des Lyons	Digitalization of Supply Chain	Master II	March 2021	COGNAC	Digitalisation Innovation project deployment
Alexis Guerin	Reactive Supply Chain Management	Master II	March 2021	B2WISE	Optimisation of industrial Supply Chains
Arthur Mendes Blunck Silveira	Supply Chain Optimisation	Master II	March 2021	EDF	Optimisation of industrial Supply Chains
Zixing LIU	Digitalisation of industrial Processes	Master II	March 2021	Whale Cloud	Deployment and test of digitalisation projects
Marghrita DIB	Digitalisation of quality Insurance processes	Master II	March 2021	Advanced Accelerator Applications	Digital Improvement of industrial processes
Hakim Kausmally	Business Process Modelling	Master II	March 2021	BOC	Improvement of Business Process Management computer tool
Juliette Heraud	Dynamic logistic planning	Master II	March 2021	SNCF	Deployment of innovation project for logistic planning
Elisabetta Parenti	Industrial plant layout improvement	Master II	March 2021	KERBIRIO	Innovation project management in industry
Paulo Galvis Cardonna	Supply Chain Management	Master II	March 2021	Verallia	Digitalized Performance measurement and

					optimisation of supply chain
Elisabetta Parenti	Digital analysis of service oriented performance	Master II	Oct. 2021	Clextral	Service performance modelling and analysis

2.4.2 Actions provided by Clextral

Clextral collaborates with EMSE to support master students during their internship. During 2019, Clextral worked with students from EMSE on 2 subjects to take primary steps to adopt a new business in the context of FOF. Actions provided by Clextral in 2019, 2020 and 2021 are reported in the Table below.

Table 2.7. Internships provided by Clextral

Item	Student Name	Specialization	Year study	Start date	Organising Company	Qualitative results
1	Roua Allaoui	Data analysis for industrial and commercial strategy	Final year of Master	May 2019	Clextral	Report on the status and history of different machines.
2	Thibault Gourdon	Studying the market of second hand extrusion machine	Final year of Master	October 2019	Clextral	Report on the status and history of second-hand machines.
3	Marghrita DIB	Management of Circular Economy for industry of the future	Master I	October 2020	Clextral	Industrial management of product renovation processes
4	Julien BECOT	Commercial offers for second-hand Machinery	Master I	October 2020	Clextral	Innovation and marketing strategy for product renovation
5	Marghrita DIB	Implementation of an industrial renovation process and service.	Master I	February 2021	Clextral	Industrial management of product renovation processes
6	Elisabetta Parenti	Digital analysis of service oriented performance	Master II	October 2021	Clextral	Service performance modelling and analysis

2.5 Bachelor, Master, PhD thesis project

2.5.1 Actions provided by EMSE

EMSE supervises the following two PhD thesis projects in collaboration with industrial partners. These thesis focus on PSS value chain and customization as the new business in the context of FOF.

Table 2.8. Bachelor, Master, PhD thesis project coordinated by EMSE

Item	Thesis Type	Student Name	Project title	Year	Target companies
1	PhD	Andres-Camilo MURILLO-COBA	Design of PSS value chains for thermic systems	2019	ElmLeblanc
2	PhD	Omar-Ahmed-Mostafa EZZAT	Modularity for PSS customization	2019	Academic
3	Master	Safae Diouri	Impact of digitalisation on manufacturing management	2019	WAVESTONE
4	Master	Bruno Mokbel	Validation of information system development in a digital context.	2019	Ernst & Young
5	Master	Mariam Lazrek	Management of innovation project portfolio	2019	NOVEANE
6	Master	Ralph Pierrot	Management of Digital transformations	2019	SIA PARTNERS
7	Master	Eva Baguet	Impact of industry of the future on logistic management	2020	Manhattan Associates
8	Master	Violette Favret			
9	Master	Vinicios Mees	Supply Chain Management	2020	KELLOGG'S
10	Master	Salma Bouraoua	Industrial Innovation for product Developement	2020	SAFRAN
11	Master	nicolas Van der laan	Losgitic management	2020	Progress Management
12	Master	Pauline Goldery	Indicator Systems for Resilient industry	2020	Cranfield Univ.
13	Master	Mayeul Arnaud Des Lyons	Digitalization of Supply Chain	2021	COGNAC
14	Master	Alexis Guerin	Reactive Supply Chain Management	2021	B2WISE
15	Master	Arthur Mendes Blunck Silveira	Supply Chain Optimisation	2021	EDF
16	Master	Zixing LIU	Digitalisation of industrial Processes	2021	Whale Cloud
17	Master	Marghrita DIB	Impact of digitalisation on quality Insurance Processes.	2021	Advanced Accelerator Applications
18	Master	Mariza Maliqi	Sustainable Smart PSS design	2021	Elm LEblanc
19	PhD	Ifeany Kenneth Etzuwoke	Machine Learning Solutions for Failure Analysis in Microelectronics Industry	2020-2022	StMicroelectronics

2.6 Excursions (lab visits, industrial visits etc.)

2.6.1 Actions provided by EMSE

EMSE organizes visits for the French academia-industry network to make all partners familiar with the competencies and capabilities of each other. In the context of factory of the Future, EMSE organized the following visits.

Table 2.9. Excursions provided by EMSE

Item	Excursion Name / Excursion topic	Company(ies) visit	Date	Participants	Qualitative results
1	EMSE PSS research team	Clextral	June 2019	6	Presentation on the company equipment and competencies
2	French partners of DigiFoF	ITM Factory	April 2019	6	Presentation on Fayol Institute, ITM Factory, objectives of ITM Factory, and Visiting the equipment of ITM Factory
3	French partners of DigiFoF	French EMSE OMILAB	April 2020	5	Presentation on OMLAB Virtual laboratory Infrastructure
4	French partners of DigiFoF	French EMSE OMILAB	July 2020	8	Teacher Training for French OMILAB
5	Participants to Industrial Workshop	French EMSE OMILAB	November 2021	15	Demonstration and Dissemination Event on EMSE OMILAB, at the International Conference PROVE'2021.

3 ULBS joint academy-industry action

In follow we will present actions carried out by ULBS partner in period 01.2019-09.2021 in the DigiFoF project.

3.1 Online and face-to-face trainings and Webinar

Members from ULBS contributed at six webinars in the two years and half of DigiFoF project, as was in proposed plan. Also, it took place (face-to-face until COVID-19 introduced restrictions – in March 2020 and online after that) a lot of vocational and professional trainings:

1. In 19.06.2019 webinar #1 with name "*Introduction to DigiFoF*" where Adrian Florea presented the actions that need to be carried out in the project and next steps in the project.
2. In 10.07.2019 webinar #2 with name "*Introduction and research interest of each Laboratory*" where colleague Ion Mironescu presented the general idea that will be integrated and develop in the white paper for this project.
3. In 23.04.2020 webinar #11, "*Computer Vision for Manufacturing Industry Application*" where our colleague prof. Remus Brad presented the idea of using modelling system in developing particular manufacturing system.
4. In 09.06.2020 webinar #13: "*Design and control of manufacturing processes in confectionery industry using ADOxx tools*" presented by Ion Mironescu.
5. In 17.12.2020 webinar #18: "*Apply the modelling languages in development of industrial applications*" presented by Dobrila Victor, Maria Muntean and Octavian Baltes (ULBS)
6. In 29.01.2021 – Webinar NEMO Crash Course webinar – "*Introduction DigiFoF Project. The FoF-Designer: Digital Design Skills for Factories of the Future"* Adrian Florea
7. In 16.04.2021 – Webinar NEMO Days April 16th : Webinar Industry of the Future, "*Introduction DigiFoF & project update",* Adrian Florea
8. In 22.01.2020 - 9 participants completed an academic training organised by ULBS entitled "*Workplace safety – Employees emotion recognition*", trainer Eng. MSc. Valentin Fleacă.
9. In period 10.04.2019 – 12.04.2019 at ULBS was organised an academic training "*Sibiu – Smart city modelling (ADOxx)*", trainer Eng. Victor Dobrilă.
10. In period 15.06.2020 – 26.06.2020 at ULBS was organized a vocational training for Continental Sibiu employees, entitled "*Workplace safety – Employees emotion recognition*" where 7 participants finished.
11. In 30.07.2020 other 28 participants completed a vocational training organized by ULBS for Continental Sibiu employees, entitled "*Workplace safety – Employees emotion recognition*", trainer Eng. MSc. Valentin Fleacă.
12. In period 5.10.2020 – 23.11.2020 was organised a vocational training entitled "*Workplace safety – Employees emotion recognition*" where 23 participants finished.
13. In period 10.04.2019 – 11.01.2021 at ULBS was organised an academic training "*Sibiu – Smart city modelling (ADOxx)*", trainer Eng. Victor Dobrilă 18 participants.

3.2 Lectures (series) in academia and industry

In 2019 ULBS have 2 students participating at NEMO 2019 in period 15-27.06.2019 – MUNTEAN Maria and BALTES Octavian Isaia and 1 participant (Victor DOBRILĂ- member of ULBS team in DigiFoF) at the training course at Vienna "Introduction to ADOxx" that took place in period 10-12.04.2019. Due to COVID-19 restrictions in 2020 the NEMO summer school was cancelled, and the mobilities of the people were limited.

In 2021 ULBS have 2 students participating at NEMO 2021 – online in period 19-30.07.2021 – CORLACIU Andrei Razvan and ANDREI Paul-Valer.

3.3 Invited talks both in academic and industrial settings

In 17.05.2019 in the context of "Hardware and Software Engendering" event organised by Engineering Faculty from ULBS took place the presentation "Research problems at CONTINENTAL Sibiu" exposed by Langa Remus from Continental Automotive System. (http://csac.ulbsibiu.ro/hse.php)

In 22.05.2019 in the event of "Marquardt Schaltsystems" organised at Engineering Faculty ULBS, Anda Antonescu have a presentation called "The R&D expansion plan of Marquardt Sibiu: Intelligence Opens Doors to New Possibilities". Detailed about the event http://inginerie.ulbsibiu.ro/fara-categorie/marquardt-schaltsysteme-s-c-s-university-event-22-05-2019/

In period 4-15.11.2019 took place the event "Continental alături de tine în Facultate" where was organized a lot of workshops by employers of Continental for the students and professors from Engineering Faculty

- "Assisted driving Autosar playground",
- "Network devices and seat control",
- "Electrical engineering for safety",
- "Finite element analysis high performance computing",
- "U.R. - from zero to hero!",
- "Cybersecurity live - penetration testing".

The detailed program is on http://inginerie.ulbsibiu.ro/wp-content/uploads/2019/10/Promovare_Conti-Attractive-ULBS.pdf

In 26-27 November 2020 have took place at the "Lucian Blaga" University of Sibiu the event "Sibiu Innovation Days SID2020" where was organised a lot of workshops by employers of European Commission and different companies from Sibiu, Cluj Napoca, Timisoara and Bucharest. The panels and presentations related to DigiFoF project are presented in the next table:

Lecture name	Speakers	Company
A user story, in the context of Industry 4.0	Valean Ioan	WEBfactory GmbH

Digitalization / Industry 4.0 in the context of cloud and distributed systems	Sebastian Negomireanu	WEBfactory GmbH
Industry 4.0: Cobots & AGVs impact in industry	Alexandru Bian	Continental Automotive Systems
SAP HANA as the architecture for fast data processing	Mark Hollaender	BearingPoint Software Solutions GmbH, Germany
Reporting evolution from a physical signed paper towards granular data accessibility	George Bontas	BearingPoint Software Solutions SRL
Research and innovation for Europe´s digital decade	Ana Luísa Correia	European Commission
Survival of the fittest through disruptive changes	Klaus-Georg Schmidt	Alfa-Horizont GmbH, Germany
Future of work - the human connection	Daniel Reisenauer	Visma Software S.R.L
The future of work: humans and machines	Iris Diaconescu	Continental Automotive Systems
Workforce skills and jobs of the future	Lukas Borunsky	European Commission
From Business Continuity to Business Resiliency	Sergiu-Valentin Dilimot	Visma Software S.R.L
Why Agile in home office works – challenges and solutions	Cristi Cimpineanu	IT Perspectives

The detailed program is on https://events.ulbsibiu.ro/innovationdays/2020.php

In 18-22 October 2021 have took place at the Continental the event "S**trategic project – Sibiu is Speaking Digitalization"** where was organised a lot of workshops by employers of Continental, ULBS and Microsoft. The panels and presentations related to DigiFoF project objective and presented by ULBS employers are:

Lecture name	Speakers	Company
Simulation-based design and optimization of manufacturing systems and processes.	prof. univ. Ion Mironescu	ULBS
Automation of assembly lines assisted by a robotic arm and a mobile robot	Eng. Octavian Balteș	ULBS

The detailed program is on CONTI_DIGITAL WEEK AGENDA 2021.pptx

In 28-30 October 2021 will took place at the "Lucian Blaga" University of Sibiu the event "Sibiu Innovation Days" SID2021 where is organised a lot of workshops by employers of European Commission, USA, Germany, Italy, Norway and different companies from Sibiu, Cluj Napoca, Timisoara and Bucharest. The panel and presentations related to DigiFoF project are presented in the next table:

Lecture name	Speakers	Company
Your Personal Assistant": Design of an Integrated IoT System for a Personalized Coach for Healthy Aging	Ciprian Candea, CEO	Ropardo

Digital Automotive Era: Innovative Technologies of the Future	Alin David, System Engineer	Sc Marquardt Schaltsysteme SCS
Cybersecurity in Continental in 2021	Marian Marin, R&D Software Project Manager & Team Leader	Continental Romania
OMiLABs in Action: Driving Innovation and Digital Transformation through Open Models	Dr. Wilfrid Utz, Managing Director	OMiLAB NPO, Germany
Skills required for success within the digital society. Hard vs Soft skills.	Răzvan Voica CEO & Co-Founder	The Informal School of IT

The detailed program is on https://events.ulbsibiu.ro/innovationdays/

3.4 Internships (e.g. Erasmus+ / student internships)

In the partnership between ULBS and companies around Sibiu some of the students go into companies to make practice in the internship period (in July). In the Table 1_ULBS is presented a list with these students that made practice in the DigiFoF domain.

Table 3.1. List of ULBS students who made practiced in Continental Automotive System Sibiu

Item	Student Name	Specialization	Year study	Period
1	Anghel Adrian	Electromechanics	III	08.07.2019-26.07.2019
2	Badiu Bogdan Vasile	Multimedia Systems Engineering	II	08.07.2019-26.07.2019
3	Bardasu Maria Roxana	Multimedia Systems Engineering	III	08.07.2019-26.07.2019
4	Berbecel Adina	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
5	Bianca Mosor	Computer science and Computer Engineering	III	08.07.2019-26.07.2019
6	Bratu Mioara	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
7	Diac Rares Dumitru	Multimedia Systems Engineering	III	08.07.2019-26.07.2019
8	Dobre Elvis Marin	Applied Electronics	III	08.07.2019-26.07.2019
9	Draghici Gabriel Constantin	Applied Electronics	II	08.07.2019-26.07.2019
10	Dragomir Darian	Multimedia Systems Engineering	II	08.07.2019-26.07.2019
11	Dragut Roxana Diana	Applied Electronics	III	08.07.2019-26.07.2019
12	Drumar Radu	Applied Electronics	II	08.07.2019-26.07.2019
13	Filip Cristian	Applied Electronics	II	08.07.2019-26.07.2019
14	Fratila Ionut	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
15	Gurau Florin Adrian	Information Technology	II	22.07.2019-9.08.2019

Item	Student Name	Specialization	Year study	Period
16	Hertoiu Bogdan George	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
17	Lica Anamaria	Multimedia Systems Engineering	II	08.07.2019-26.07.2019
18	Linte Irina	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
19	Lupu Andreea	Computer science and Computer Engineering	III	08.07.2019-26.07.2019
20	Muresan Mihai	Information Technology	II	08.07.2019-26.07.2019
21	Nanu Paul	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
22	Neacsu Maria Madalina	Applied Electronics	II	08.07.2019-26.07.2019
23	Popa Nicolae Catalin	Applied Electronics	III	08.07.2019-26.07.2019
24	Pridie Ceridian Atanasie	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
25	Statescu Andrei	Information Technology	II	08.07.2019-26.07.2019
26	Totoroga Madalina	Information Technology	II	08.07.2019-26.07.2019
27	Tudoroiu Ilie Valentin	Applied Electronics	III	08.07.2019-26.07.2019
28	Turbureanu Aida Maria	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
29	Udrescu Claudiu	Electromechanics	III	08.07.2019-26.07.2019
30	Vasilas Iulia	Computer science and Computer Engineering	II	08.07.2019-26.07.2019

Students that made the internship at COMPA SA Sibiu (consortium with PRELMET partner) in the period 09.07.2019-27.07.2019.

Table 3.2. List of ULBS students who made practiced at COMPA SA Sibiu (PRELMET partner)

Item	Student Name	Specialization	Year study	Period
1	Argesanu Marin-Daniel	Machines Manufacturing Technologies	II	09.07.2019-27.07.2019
2	Catana Narcis-Constantin	Machine-Tools and Production Systems	III	09.07.2019-27.07.2019
3	Contiu Elena	Mechatronics	II	09.07.2019-27.07.2019
4	Crisca Raul-Sorin	Machines Manufacturing Technologies	II	09.07.2019-27.07.2019
5	Cristian Bogdan Andrei	Machine-Tools and Production Systems	II	09.07.2019-27.07.2019
6	Cucu Ovidiu-Gabriel	Machines Manufacturing Technologies	II	09.07.2019-27.07.2019
7	Gindila Ana-Maria	Economic Engineering in Mechanical field	II	09.07.2019-27.07.2019

Item	Student Name	Specialization	Year study	Period
8	Gherasim Alexandru-Victor	Mechatronics	II	09.07.2019-27.07.2019
9	Gligor Emanuel-Ioan	Mechatronics	II	09.07.2019-27.07.2019
10	Haiduc Alexandra-Elena	Engineering and Environmental Protection in Industry	III	09.07.2019-27.07.2019
11	Magureanu Iulian-Florin	Economic Engineering in Mechanical field	II	09.07.2019-27.07.2019
12	Manole Paul-Andrei	Mechatronics	II	09.07.2019-27.07.2019
13	Popa Claudiu-Andrei	Machines Manufacturing Technologies	III	09.07.2019-27.07.2019
14	Stoisor Miruna-Maria	Economic Engineering in Mechanical field	III	09.07.2019-27.07.2019
15	Tiplea Maria-Iuliana	Economic Engineering in Mechanical field	II	09.07.2019-27.07.2019
16	Vadean Catalina-Ioana	Engineering and Environmental Protection in Industry	III	09.07.2019-27.07.2019
17	Viloiu Irina	Machines Manufacturing Technologies	III	09.07.2019-27.07.2019
18	Visa Andreea-Ecaterina	Machine-Tools and Production Systems	III	09.07.2019-27.07.2019
19	Vlad Nicolae-Madalin	Machines Manufacturing Technologies	III	09.07.2019-27.07.2019

3.5 Bachelor, Master, PhD thesis project

Companies around Sibiu in the collaboration with the "Lucian Blaga" University of Sibiu proposed in each year a list of bachelor and master issues that can be develop by students from university in collaboration with companies. In the Table 2 are provided a list with the name of the students and the project title that was coordinate by professor from ULBS that are involved in the DigiFoF project: Daniel Volovici, Remus Brad, Adrian Florea, Daniel Morariu.

Table 3.3. ULBS List with students that develop projects for companies

Item	Thesis Type	Student Name	Project title	Year	Target companies
1	Master	FLEACĂ Valentin	Face Emotion Recognition	2019	Continental System Sibiu
2	Master	IAMANDI Laura Diana	System for picking and estimating the number of objects in a warehouse	2019	Continental System Sibiu
3	Master	STANCIU Sergiu Gabriel	Small scale autonomous guided vehicle	2019	Continental System Sibiu
4	Master	MODRÂNGĂ Cristina Maria	A Study of Hematoma Detection from Medical Images	2019	Sibiu County

Item	Thesis Type	Student Name	Project title	Year	Target companies
					Clinical Hospital
5	Master	TALPOȘ Elena Mădălina	A Study of Pedestrian Detection from Infrared Images	2019	Continental System Sibiu
6	Master	STOIA Paul Claudiu	Automatic Measurements of Foetal Head Circumference in Ultrasound Images	2019	Sibiu County Clinical Hospital
7	Bachelor	Durdun Abel Emanuel	Development of a hardware-software application for air quality monitoring	2019	Environmental Protection Agency Sibiu
8	Bachelor	Dușleag Alin Dumitru	Smart buffer	2019	Continental System Sibiu
9	Bachelor	Opriș D-I. Karina-Mihaela	Driver Assistance application by obstacles detection	2019	Continental System Sibiu
10	Bachelor	Lică I. Adelina Teodora	Position and braking lights detection at motor vehicles from image sequences	2019	Continental System Sibiu
11	Bachelor	Boștină V. Cătălina-Maria	Pedestrian detection from image sequences	2019	Continental System Sibiu
12	Bachelor	Mesea V. Ionica-Cristina	Defect detection on the road surfaces	2019	Continental System Sibiu
13	Bachelor	Ciucă A. Mihai Marius	Behaviour autonomous car prediction in the event of a pedestrian collision	2019	Continental System Sibiu
14	Bachelor	Danciu L. Daniel-Ionuț	Application for controlling the specific parameters to a robotic arm. Analysis the cobot problems	2019	Marquardt GmbH Sibiu
15	Bachelor	Oancea Ș. Andrei Ștefan	Development an interlocking system applied to manual processes in production.	2019	IFM efector /prover SRL
16	Bachelor	Ciuclea G. Victor-Ștefan	Stack consumption analysis in the context of embedded systems applications.	2019	Continental System Sibiu
17	Bachelor	Olariu I. Diana Ioana	Air quality information and monitoring platform using IoT devices.	2019	Sibiu City Hall, Environmental Protection Agency Sibiu

Students from Bachelor and Master that Develop Thesis on the Project Fields in 2020:

Item	Thesis Type	Student Name	Project Title	Year	Target Companies
1	Bachelor	Muntean I. Maria	Parking of a M-BOT with help of modelling language	2020	DigiFoF Project
2	Bachelor	Budiu C.N. Cristiana-Roxana	Classification of sounds from vehicles	2020	Continental System Sibiu
3	Bachelor	Dobrin D Flavius-Daniel	Hardware and software system for detecting the correct position of the spine	2020	Sibiu County Clinical Hospital
4	Bachelor	Balteș I. Octavian-Isaia	Automation of assembly lines with help of the robotic arm and an M-BOT.	2020	DigiFoF Project
5	Bachelor	Purece D. Ana-Maria	Development of a dedicate air quality monitoring system	2020	Environmental Protection Agency Sibiu
6	Bachelor	Mondoc N. Anca Claudia	Remotely controlled mobile robot (with real-time playing images)	2020	Marquardt Schaltsysteme Sibiu
7	Bachelor	Bîrsan S. Cristina Andreea	Detection of brain tumours with imaging processing	2020	Sibiu County Clinical Hospital
8	Bachelor	Milașcon I. Lidia	Detection and counting of vehicles for a video source	2020	Continental System Sibiu
9	Master	Carjan G. Diana-Florinela	Pneumothorax detection and segmentation in chest x-ray images	2020	Sibiu County Clinical Hospital
10	Master	Vasilaş C. Teodora	Automatic design space explorer for VLIW architecture	2020	Continental System Sibiu
11	Master	Rădulescu M. Marius-Constantin	Image processing for smart parking lot	2020	Continental System Sibiu
12	Master	Hagiu(Radulescu) M. Maria Elena	Image processing for fog detection	2020	Continental System Sibiu
13	Master	Filimon I. Raul - Constantin	Artificial Intelligence application for traffic management systems	2020	Visma Software S.R.L.
14	Master	Moraru N. Diana-Ionela	Storage manager using AGVs for manufacturing in the context of industry 4.0	2020	Continental System Sibiu
15	Master	Dragoe M.F Gina-Irina	A method for face detection using Viola-Jones algorithm	2020	Continental System Sibiu
16	Master	Popa G.Carmen	Localization and mapping with autonomous robot, based on Lidar sensors	2020	Continental System Sibiu
17	Master	Aflat Horea Ovidiu	Walking bag	2020	
18	Master	Marcu D. Simona-Daniela	Innovative solution for parking-sharing of private institutions	2020	Continental System Sibiu
19	Master	Ciorîcă I. Florentin Cătălin	Autonomous self-driving museum assistant	2020	Continental System Sibiu

Students from Bachelor and Master that Develop Thesis on the Project Fields in 2021:

Item	Thesis Type	Student Name	Project Title	Year	Target Companies
1	Bachelor	Ranf Carmen Maria	Automotive communication simulators: Automation and generation methods	2021	Continental System Sibiu
2	Bachelor	Cucu Iulian Ionut	Wirelessly controlled robotic hand	2021	Marquardt Schaltsysteme Sibiu
3	Bachelor	Popa Sergiu	Android application for controlling an Arduino 4WD Smart Car	2021	Marquardt Schaltsysteme Sibiu
4	Bachelor	Bratu Mioara Raveca	Course scoring system based on facial recognition	2021	Continental System Sibiu
5	Bachelor	Patrausanu Andrei	Smart key - advanced verification and diagnosis system	2021	Marquardt Schaltsysteme Sibiu
6	Bachelor	Poplacean Ionut	Human Interface Simulation Kit	2021	Marquardt Schaltsysteme Sibiu
7	Bachelor	Bacila Emil Florin	System for identifying defects in the manufacturing process of printed circuit boards (PCBs)	2021	Continental System Sibiu
8	Bachelor	Pura Alina	Weather station with ATMega324PB	2021	Smart City
9	Bachelor	Linte Irina	Eye tracking using neural networks and image processing techniques with applications in monitoring website content	2021	
10	Bachelor	Cerneanu Mihai	Modelling and simulation of an automated chocolate production system	2021	PRO IT
11	Bachelor	Vacaru Rebeca	Real Time Digital Investigation Automation	2021	NTT Data
12	Bachelor	Statescu Andrei Catalin	Arduino system for monitoring and control through WWW of environmental parameters	2021	Smart City
13	Bachelor	Margarit Crina	Development of a dedicated application for testing the hardware components of a remote system	2021	Marquardt Schaltsysteme Sibiu
14	Bachelor	Andreescu Stefan	Controllable irrigation system on the phone using Raspberry Pi 3 B +	2021	??
15	Bachelor	Lac Alexandra	Personal assistant- Smart House	2021	PRO IT
16	Bachelor	Topor Alina	Arduino application: mini weather station	2021	Smart City
17	Bachelor	Dinu Diana	Contract Management	2021	Continental System Sibiu
18	Bachelor	Dragoman Darian	Smart home	2021	Smart City
19	Bachelor	Cirdei Beatrice	Protective mask detection application	2021	Continental System Sibiu

Item	Thesis Type	Student Name	Project Title	Year	Target Companies
20	Master	Lupascu Ghenadie	Smart building solutions	2021	Sibiu Polisano
21	Master	Tocitu Maria Delia	Bluetooth controlled robot from a mobile device	2021	Continental System Sibiu
22	Master	Benea Tabita	Rebooting retails in smart stores using new camera-based technologies	2021	??
23	Master	Lupu Arsenie	Advance control and monitoring techniques for brushless motors with hall sensors	2021	Continental System Sibiu

3.6 Excursions (lab visits, industrial visits etc.)

In period 9-16.12.2019 took place the excursion "Fascinatia industriei auto (The fascination of the auto industry)" with the following main objectives that were visited:

- BMW company and museum;
- Audi company and museum;
- Technical museum Munich.

The list with all 45 students who participated at this excursion is submitted in the document "D5.2-List of participants_ULBS".

4 UNIBG joint academy-industry action

In follow we will present actions carried out by UNIBG partner in period 01.2019-10.2021 in the DigiFoF project. Some of actions was planned and described already in the deliverable D5.1 because the deliverable D5.1 was prepared at the end of the 2020 year, according to the planning, and already some of the actions were being carried out.

4.1 Online and face-to-face trainings and Webinar

Members from UNIBG contribute at one webinar in the 2019 year, as was in proposed plan:

1. In 07.10.2019 webinar #2 with name "Introduction and research interest of each Laboratory" where Fabiana Pirola presented the general idea that will be integrated and develop in the white paper for this project.
2. In 11.03.2020 webinar #10 with name "Omilab use case: IoT platform as enabler of new Product-Service" where Fabiana Pirola presented an Omilab use case in the field of PSS.

4.2 Lectures (series) in academia and industry

Lectures topic	Lecturer / Participant	Date	Participants	Qualitative results
NEMO 2019	Sergio Cavalieri	July 2019	50	Knowledge transfer re-used by PhD students; practical exercices re-used for other teaching purposes
Operations management	Sergio Cavalieri/ Fabiana Pirola	September 2020	50	Teachings programmed yearly to transfer knowledge to master students. Proposal of BPM projects to students.
Supply and service chain management	Giuditta Pezzotta	May 2019	50	Teachings programmed yearly to transfer knowledge to master students.
Operations management for FoF	Fabiana Pirola	May 2020	15	Knowledge transfer to professionals, with particular focus on operations management 4.0 and BPM (modelling and simulation)
Service management for FoF	Giuditta Pezzotta	November 2020	15	Knowledge transfer to professionals focused on the transition towards servitization
Long life training in service management	Giuditta Pezzotta	November 2020	15	Knowledge transfer to professionals focused on the transition towards servitization
BPM in textile industry	Fabiana Pirola	July 2020	12	Knowledge transfer to professionals with particular focus on BPM and BPMN 2.0
Operations 4.0 and BPM	Fabiana Pirola	February 2021	7	Knowledge transfer to professionals with particular focus on Operations 4.0, BPM and BPMN 2.0
Service operations and engineering for FoF	Giuditta Pezzotta	December-January 2021	10	Knowledge transfer to professionals focused on the methods and tool for PSS engineering
PSS design and engineering	Giuditta Pezzotta	May 2021	18	Knowledge transfer to professionals focused on the methods and tool for PSS engineering

Lectures topic	Lecturer / Participant	Date	Participants	Qualitative results
Service operations and engineering for FoF	Giuditta Pezzotta	May 2021	7	Knowledge transfer to professionals focused on the transition towards servitization
Supply and service chain management	Giuditta Pezzotta	May 2021	70	Teachings programmed yearly to transfer knowledge to master students.
Service operations and engineering for FoF	Giuditta Pezzotta	June 2021	12	Knowledge transfer to professionals focused on the transition towards servitization
Service operations and engineering for FoF	Giuditta Pezzotta	June 2021	20	Knowledge transfer to professionals focused on the transition towards servitization
Service operations and engineering for FoF	Giuditta Pezzotta	June 2021	25	Knowledge transfer to professionals focused on the transition towards servitization
Sistemi cyberfisici e digital twin	Fabiana Pirola	July 2021	25	Knowledge transfer to professionals focused on CPS, simulation and digital twin
Service Engineering models for the design and development of Digitalised Product-Service Systems - NEMO 2021	Sergio Cavaleri &Giuditta Pezzotta	July 2021	100	Knowledge transfer to phD students focused on the transition towards servitization

4.3 Invited talks both in academic and industrial settings

On 06.11.2019 the visiting researcher Antonio Maffei provided a talk on “Business Models and challenge-driven research: a perspective from production research”.

On 21.10.2020 dr. Claudio Turconi, CIO of Ratti Spa provided a speech on “Production monitoring with product tracking and product/process integration”.

On 02.12.2020 dr. Julo Galati and Daniele Nisoli provided a speech on “The adoption of Lean 4.0 in industry”.

On 20.05.2021 dr. Elena Legnani, IT project manager in Wittur provided a speech on “IT systems for production planning and the control”

4.4 Internships (e.g. Erasmus+ / student internships)

In the partnership between UNIBG and companies around Bergamo some of the students go into companies to make practice in the internship period.

Table 4.1. UNIBG students who made internships

Item	Student Name	Specialization	Year study	Start date	Organising Company
1	Bonaldi Francesco	Management engineering	2	13.02.2019	Balance systems

2	Cavaliere Concetta	Engineering and Technology for health	3	11.09.2019	Synlab
3	Luca Doneda	Management engineering	2	01.11.2019	Ratti SpA
4	Facheris Valentina	Management engineering	2	20.01.2020	SMI SpA
5	Erika Milesi	Management engineering	2	20.01.2020	SMI SpA
6	Marco Venuta	Management engineering	2	20.01.2020	SMI SpA
7	Alessandro Manzoni	Management engineering	2	20.01.2020	SMI SpA
8	Sonia Amigoni	Management engineering	2	01.02.2020	Aesys
9	Sara Somaini	Management engineering	2	15.11.2020	Fedabo
10	Francesco Cazzaniga	Management engineering	2	15.11.2020	Fedabo
11	Ilaria Bianchini	Management engineering	2	05.10.2020	Ratti SpA
12	Aharon Gentili	Management engineering	2	01.12.2020	Tenaris SpA
13	Cattaneo Chiara	Management engineering	2	28/05/2021	CMS spa
14	Chiodini Stefania	Management engineering	2	07/05/2021	Balance Systems Srl
15	Scuri Federico	Management engineering	2	24/05/2021	SMI spa

4.5 Bachelor, Master, PhD thesis project

Companies around Bergamo in the collaboration with the University of Bergamo proposed in each year a list of bachelor and master issues that can be develop by students from university also in collaboration with companies. In the Table 2 are provided a list with the name of the students and the project title that was coordinate by professor from UNIBG that are involved in the DigiFoF project: Fabiana Pirola, Giuditta Pezzotta, Sergio Cavalieri, Roberto Pinto. Other theses have been developed on the topic related to the factory of the future.

Table 4.2. UNIBG list with students that develop projects on the FoF topics

Item	Thesis Type	Student Name	Project title	Year	Target companies
1	PhD	Roberto Sala	Design and assessment of a decision-making process for data-driven maintenance provision in Product-Service System	2020	Balance Systems SMI Spa
2	PhD	Chiara Cimini	A roadmap for the integration of human workers and technology in the next generation manufacturing systems: a socio-technical perspective	2019	Brembo

Item	Thesis Type	Student Name	Project title	Year	Target companies
3	PhD	Michela Zambetti	A data-driven approach to PSS engineering: explore the potential of data availability and its impact on PSS ecosystem	2020	ABB
4	Bachelor	Piantoni Mattia	Analysis of the production and organizational processes of an engineering company with a view to continuous improvement	2019	
5	Bachelor	Trapletti Andrea	Analysis of the production and organizational processes of an engineering company with a view to continuous improvement	2019	
6	Bachelor	Piazzalunga Marco	Industry 4.0 applications in the agro-food sector	2019	MioOrto
7	Bachelor	Barzani Claudia	Big Data in Operations Management	2019	
8	Bachelor	Brambilla Chiara Maria	Big Data in Operations Management	2019	
9	Bachelor	Rachdaoui Badr	Cyber-Physical Systems in the context of product-service systems: analysis of literature and services offered	2019	
10	Master	Amato Hernandez Paolo Andres	Decision making in field service scheduling	2019	AtlasCoop
11	Master	Bendotti Michele	Digital Transformation as a challenge for the new era of SCM: measuring the digital maturity level of the Supply Chain through Readiness Assessment tools	2019	
12	Master	Locatelli Andrea	Digital Transformation as a challenge for the new era of SCM: measuring the digital maturity level of the Supply Chain through Readiness Assessment tools	2019	
13	Master	Lombardoni Barbara	Engineering and assessment of product-service solutions in manufacturing realities: the BFT case	2019	BFT
14	Master	Maltagliati Miranda Silvia	Engineering and assessment of product-service solutions in manufacturing realities: the BFT case	2019	BFT
15	Bachelor	Rigamonti Alessandra	Internet of Things in the 4th range production chain.	2019	
16	Master	Ferrari Giorgia	The re-engineering of the production planning process in the context of Industria 4.0: the Ratti S.p.A. case.	2019	Ratti
17	Master	Bertoletti Sara	The re-engineering of the production planning process in	2019	Ratti

Item	Thesis Type	Student Name	Project title	Year	Target companies
			the context of Industria 4.0: the Ratti S.p.A. case.		
18	Bachelor	Persico Matteo	Discrete event simulation of production systems: comparison between two simulators in a real-life case	2019	
19	Bachelor	Previtali Francesca	Discrete event simulation of production systems: comparison between two simulators in a real-life case	2019	
20	Bachelor	Belotti Riccardo	Logistics 4.0: analysis of the new technologies to support the operator	2019	
21	Bachelor	Carrara Simone	Maintenance 4.0: principles, strategies, technologies and application cases.	2019	
22	Bachelor	Salvatoni Alberto	Maintenance 4.0: principles, strategies, technologies and application cases.	2019	
23	Bachelor	Lombardi Nicola	Re-engineering of production processes for a company working on a single order: the Innse-Berardi S.p.A case	2019	Innse-Berardi
24	Bachelor	Rota Luca	Sustainable Product-Service System Design from a strategic sustainable development perspective	2019	
25	Bachelor	Guazzi Marta	5G Technologies in the Manufacturing Industry: state of the art, potential and future developments	2019	
26	Bachelor	Limonta Andrea	The evolution of business models in the clothing industry in context of Industry 4.0	2019	
27	Bachelor	AHBAR DOUNIA	Simulation models developed for the spread of infectious diseases	2020	
28	Bachelor	ALBORGHETTI FEDERICA	Development of a use case in the healthcare field within OMiLAB - laboratory for research and experimentation of modelling methods	2020	
29	Bachelor	LUCCHINI ALICE	Simulation models and prediction techniques for the spread of infectious diseases	2020	
30	Bachelor	MAGNI MARTINA	Pipette controllers and spare parts management: San Raffaele Hospital Case	2020	
31	Bachelor	ARRIGONI DANIELE	Sizing and design of automated warehouses	2020	
32	Bachelor	BESTETTI LUCA	Analysis and optimization of material flows within a production department: the Brembo S.p.A. case.	2020	Brembo S.p.A.

Item	Thesis Type	Student Name	Project title	Year	Target companies
33	Bachelor	MORSTABILINI ANDREA	Application of artificial intelligence in service delivery in manufacturing companies	2020	
34	Bachelor	TASCA MARCO	Setting up a Performance Measurement Dashboard for Maintenance	2020	
35	Bachelor	AGUSTONI STEFANO	Reorganization and optimization of warehouse layout: the My Cooking Box case	2020	My Cooking Box
36	Bachelor	FERRARI ZOE	Reorganization and optimization of warehouse layout: the My Cooking Box case	2020	My Cooking Box
37	Bachelor	AMIGONI SONIA	Application of Lean Thinking tools for the optimization of assembly processes: the Aesys SPA case	2020	Aesys SPA
38	Bachelor	QUADRIO UMBERTO	A stochastic model of Total Landed Cost to support decision making in a manufacturing supply chain	2020	
39	Bachelor	NORIS SIMONE	Redesigning cooking center maintenance plans: the Dussmann Service case	2020	Dussmann Service
40	Master	JOY ALBY	An overview of Decision Support System in maintenance from Industry 4.0 perspective	2020	
41	Master	MANSURI ALI NUREDDIN ALI	Application of Blockchain Technology in the Oil and Gas industry	2020	
42	Master	FACHERIS VALENTINA	Business processes reengineering within an IoT platform implementation project: the Smi case study	2020	SMI Spa
43	Master	ABBATTISTA ALESSIO	L'adozione della tecnologia 5G nei sistemi di produzione: uno studio esplorativo	2020	
44	Master	MILESI ERIKA	Business processes reengineering within an IoT platform implementation project: the Smi case study	2020	SMI Spa
45	Master	BALDI LORENZO	Logistics processes optimization in a factory open yard	2020	
46	Master	MANZONI ALESSANDRO	IoT platform for the dynamic monitoring of key-performance indicators: the SMI case study	2020	SMI Spa
47	Master	VENUTA MARCO	IoT platform for the dynamic monitoring of key-performance indicators: the SMI case study	2020	SMI Spa
48	Master	CORONA MATTEO	The machine learning algorithm selection framework: test with multiple datasets	2020	

Item	Thesis Type	Student Name	Project title	Year	Target companies
49	Master	ARDITI ANTONIO	Supply Chain Sustainability: A Multi-objective Closed-loop Cycle Model for the WEEE Industry	2020	
50	Master	BOSCHINI GABRIELE	The adoption of 5G technology in manufacturing systems: an exploratory study	2020	
51	Master	Cumetti Michele	Hybrid simulation to analyse SARS-CoV-2 infection spreading in a high epidemiological risk environment: case study in a high school setting	2021	
52	Master	Colleoni Martina	Designing product-service solutions with hybrid simulation: the case of Fashion Renting	2021	
53	Master	Mazzoleni Michela	Modelling the contagion of SARS-CoV-2 infection: insight from a hybrid modelling applied in the university environment	2021	
54	Master	Bianchini Ilaria Martina	RFID technology for factory traceability in the textile sector: the case of Ratti SpA	2021	Ratti Spa
55	Master	Stranieri Andrea Cosimo	Reengineering of the process of field service through the hybrid simulation: a business case	2021	
56	Master	Zennaro Rosanna	Designing a fashion renting supply chain by use of simulation	2021	
57	Bachelor	Testa Lorenzo	Verso l'industria 4.0 attraverso le learning factory. Sviluppo di una dashboard di controllo dei processi industriali: la Fischertechnik Training Factory.	2021	
58	Bachelor	Sassi Annamaria	Verso l'industria 4.0 attraverso le learning factory. Sviluppo di una dashboard di controllo dei processi industriali: la Fischertechnik Training Factory.	2021	
59	Bachelor	Ghilardi Luca	LEARNING FACTORY as a tool for transition to Industry 4.0: cases and applications	2021	
60	Bachelor	Rivoltella Asya	Agent-based simulation in the service industry: literature review.	2021	
61	Master	Arioli Veronica	Understanding the impact of control measures and vaccines during SARS-CoV-2 epidemic: a System Dynamics simulation applied in Lombardy	2021	
62	Master	Gentili Aharon	Implementation of condition-based maintenance strategies in the steel pipes manufacturing process: the Tenaris Dalmine case study	2021	Tenaris spa

4.6 Excursions (lab visits, industrial visits etc.)

In 2019-2021, took place the following three excursions:

- 28.10.2019: visit to the SMILE (Smart Manufacturing Innovation Lab) with 10 participants;
- 28.11.2019: Industry 4.0 in action at ABB Italy with 55 participants;
- 20.11.2019: Lean 4.0 in action at Vinservice with 50 participants.
- 29.01.2021: Service 4.0 in SMI Spa with 10 participants.
-

The list of participants is reported in the document “D5.2-List of participants_UNIBG”.

Due to COVID pandemic we were not be able to organize excursions in 2020 and we were limited in 2021.

5 UNIBIAL joint academy-industry action

5.1 Online and face-to-face trainings and Webinar

Table 5.1. UNIBIAL webinars and trainings

Item	Webinar topic	Presenter	Date
1	Introduction and research interest of each Laboratory	Arkadiusz Jurczuk	07.10.2019
2	Gaps in digital competencies of the employees of the Factory of the Future	Julia Siderska	16.01.2020
3	DIGIFoF webinar 2nd NEMO Days, Virtual lecture Autonomous vehicle fleet management	Arkadiusz Jurczuk Zbigniew Misiak (BOC)	16.04.2021
4	DIGIFoF vocational trainings series Business model canvas for FoF strategy creation	Alicja Gudanowska	21-22.04.2021
5	DIGIFoF vocational trainings series Design thinking for product and service design	Alicja Gudanowska	26-28.04.2021 (trainings were provided for 80 participants in total)
6.	DIGIFoF vocational trainings series Artificial intelligence (AI) and Cloud Manufacturing (CM) tools as elements of Industry 4.0	Julia Siderska	21-30.04.2021 (trainings were provided for 80 participants in total)
7.	DIGIFoF vocational trainings series Fundamentals of Business Process Management	Arkadiusz Jurczuk	19-23.04.2021 (trainings were provided for 80 participants in total)
8.	DIGIFoF webinar #22 Robotic Process Automation – possibilities of practical applications	Julia Siderska	30.06.2021

In the webinar “Introduction to DigiFoF” main areas of scientific research carried out by UNIBIAL team were presented. Furthermore, the capabilities of UNIBIAL Laboratory and its potential input into the DIGIFoF project were introduced.
Webinar “Gaps in digital competencies of the employees of the Factory of the Future” aimed at presenting general results from “Report on needs and demands for FoF-design: Findings and recommendations” and recommendations on the scope of potential trainings for students and employees.

Furthermore, DIGIFoF project deliverables were presented by Arkadiusz Jurczuk, Alicja Gudanowska on 04.12.2019 during the workshop “Management challenges” organised by *The Scientific Society of Organization and Management, Branch in Bialystok* and *Polish Association for Production Management, Branch in Bialystok*. They gave a talk about demands and needs in the scope of digital competencies of the employees of the Factory of the Future.
Detailed about the event are submitted on the websites:

Bialystok University of Technology, Faculty of Engineering Management

https://wiz.pb.edu.pl/2019/11/21/kolejne-seminarium-warsztatowe-pt-wyzwania-zarzadzania-5-0/

The Scientific Society of Organization *and Management*
http://www.tnoik.org/index.php?option=com_content&view=article&id=176:seminaria-warsztatowe-pt-wyzwania-zarzdzania-50-2019&catid=40:aktualnoci&Itemid=18

The webinar "Autonomous vehicle fleet management" has been provided in cooperation with BOC Poland. It covers chosen aspects of FoF design including process identification, modelling and simulation as tools to support planning and managing of autonomous car fleet operations. The webinar was delivered by Arkadiusz Jurczuk from Bialystok University of Technology and Zbigniew Misiak from BOC Group, Poland.

The DIGIFoF vocational trainings were organised and prodided in co-operation with BOC and Innovation and Development Promotion Centre (IDPC). Trainings have been provided for 80 participants from manufacturing sector mainly in the reported period. Training sessions given by UNIBIAL covered four main areas:

- Business model canvas for FoF strategy creation,
- Design Thinking for Product and Service Design,
- "Artificial intelligence (AI) and Cloud Manufacturing (CM) tools as elements of Industry 4.0"
- Fundamentals of Business Process Management.

The training "Business model canvas for FoF strategy creation" focused on the ability to create and develop business models. The training was delivered online for entrepreneurs.

The "Design Thinking for Product and Service Design" training focused on the ability to design new products, create innovative solutions, and plan their implementation according to the idea of design thinking. The training was conducted online for entrepreneurs.

The "Artificial intelligence (AI) and Cloud Manufacturing (CM) tools as elements of Industry 4.0" training focused on the ability to model, simulate and support a decision process with the use of artificial neural networks and expert systems.

The webinar "Robotic Process Automation – possibilities of practical applications" was provided by Julia Siderska as part of DIGiFoF webinars series. During the on-line meeting, the possibilities of using software robots to improve business processes were discussed. The presented case study allowed participants to learn the basic principles of process design and UiPath Studio solutions.

5.2 Lectures (series) in academia and industry

In the reported period 25 lectures and workshops have been provided. They were given for students of Bialystok University of Technology (UNIBIAL) and international students, among others in the scope of Erasmus+ Programme (see Table 2).

Table 5.2. UNIBIAL lectures in academia

Item	Topic	Lecturer	Period	Number of participants
1	Business process management	Arkadiusz Jurczuk	October 2019/ January 2020	52
2	Process management (Erasmus+ Programme)	Arkadiusz Jurczuk	October 2019/ January 2020	4
3	Design business models for services	Arkadiusz Jurczuk	November 2019/ January 2020	17
4	Modern management methods and tools in logistics (Robotic Process Automation)	Julia Siderska	October 2020/January 2021	30
5	Contemporary methods of management and smart IT tools (Robotic Process Automation – workshop)	Julia Siderska	October 2020/January 2021	10
6	Business Model Canvas in service engineering (workshop)	Alicja Gudanowska	March and May 2020	20
7	Creating a roadmap for selected technological innovation (workshop) (Erasmus+ Programme)	Alicja Gudanowska	December 2019	4
8	Creating a roadmap for selected technological innovation (workshop) (Erasmus+ Programme)	Alicja Gudanowska	May - June 2020	6
9	Business process management	Arkadiusz Jurczuk	October 2020/January 2021	68
10	Process management (Erasmus+ Programme)	Arkadiusz Jurczuk	October 2020/January 2021	2
11	Designing business models for service activities	Arkadiusz Jurczuk	October 2020/January 2021	13
12	Network analysis in virtual and hybrid service management (lecture)	Alicja Gudanowska	October 2020/January 2021	13
13	Creating a roadmap for selected technological innovation (workshop) (Erasmus+ Programme)	Alicja Gudanowska	October 2020/January 2021	2
14	Business Model Canvas in service engineering (workshop)	Alicja Gudanowska	March/May 2021	22
15	Business Model Canvas in logistic service engineering (workshop)	Alicja Gudanowska	March/May 2021	37
16	Quality management in logistics (lecture and workshops)	Alicja Gudanowska	March/May 2021	87

17	Creating a roadmap for selected technological innovation (workshop) (Erasmus+ Programme)	Alicja Gudanowska	May/June 2020	9
18	Cyber-physical systems	Julia Siderska	January/March 2021	20
19	Contemporary methods of management and smart IT tools	Julia Siderska	January/March 2021	10
20	Application of artificial intelligence techniques in logistics	Julia Siderska	March/June 2021	80
21	Intelligent manufacturing chains	Julia Siderska	March/June 2021	20
22	Business process management	Arkadiusz Jurczuk	March/June 2021	15
23	Process management (Erasmus+ Programme)	Arkadiusz Jurczuk	March/June 2021	13
24	Logistic processes designing	Arkadiusz Jurczuk	March/June 2021	110
25	Industrial process modelling	Arkadiusz Jurczuk	March/June 2021	31

Providing lectures covered the chosen issues related to business models and process management and as well the usage of IT tools, Cyber-physical systems for process improvement. Lectures and practical classes were part of the obligatory curriculum of the Faculty of Management Engineering. The OMILAB infrastructure was used for some of the teaching activities.

5.3 Invited talks both in academic and industrial settings

In the reported period, UNIBIAL team took part in three meetings organised by Innovation and Development Promotion Centre (IDPC). Moreover, some lectures and talks have been provided in the scope of conferences and activities supported by regional or national governance bodies and authorities.

Table 5.3. UNIBIAL invited talks provided in the reported period

Item	Presented topic	Presenter	Date	Company
1	Role and functionality of OMILABFoF	Arkadiusz Jurczuk	17.12.2019	Metal Processing Cluster (MPC) General Meeting of Shareholders
2	Idea of OMILABFoF laboratory	Arkadiusz Jurczuk	15.01.2020	Metal Processing Cluster (MPC) GZW Lobbing
3	Needs and demands of the employees of the Factory of the Future – selected aspects	Alicja Gudanowska	25.02.2020	TOCK-AUTOMATYKA
4	Business process automation with the use of Robotic Process Automation technology	Julia Siderska	13.11.2020	The Future Industry Platform
5	Application of intelligent automation technology at various supply chains	Damian Kędziora (Guest lecturer, Norian)	18.12.2020	Norian/ Bialystok University of Technology
6	Allocative approach to typology of sources of business process inconsistency	Arkadiusz Jurczuk	22.12.2020	Bialystok University of Technology
7	Automation of business processes with the use of *Robotic Process Automation* technology	Julia Siderska	29.01.2021	Invited lecture - Future Industry Platform
8	Business processes automation with the use of *Robotic Process Automation* technology	Julia Siderska	16.02.2021	Invited lecture – workshops "Chemistry 4.0"
9	*Robotic Process Automation* – trend or necessity?	Julia Siderska	24.02.2021	Bialystok University of Technology
10	Business processes automation with the use of *Robotic Process Automation* technology	Julia Siderska	16.09.2021	Invited lecture – conference "Industry 4.0 – challenges of the manufacturing sector"

Two invited talks were devoted to a role of OMILABFoF the laboratory in digital competency development. Presentation was addressed to potential beneficiaries of DIGIFoF project - members of Metal Processing Cluster (MPC). The presentation given by Alicja Gudanowska considered areas of potential trainings for students and pupils of technical and vocational-technical schools as well.

The guest lecture "Application of intelligent automation technology in various supply chains" presented by Damian Kedziora from Norian was addressed to master and bachelor students of Bialystok University of Technology (Faculty of Engineering Management). The lecture focused on business process digitalization aspects including: Robotics Process Automation in service industry, Blockchain, Artifial Inteligence.

Moreover, the presentations and talks provided in the reported period concerned the problems of process automation and RPA technology implementation and as well business process identification and analysis. Talks have been provided for both academics and business representatives.

5.4 Internships (e.g. Erasmus+ / student internships)

Internships in the DigiFoF domain were organised in cooperation with Innovation and Development Promotion Centre (IDPC) and Metal Processing Cluster (MPC). Details about this cooperation are given in section 9.
Due to the COVID pandemic, internship activities were cancelled or limited.

5.5 Bachelor, Master, PhD thesis project

As part of the didactic activity and cooperation with business, thesis on selected aspects of FoF is conducted. In the reporting period, 8 theses (bachelor and engineering) were finished. The works were mainly related to process modelling, Scene2model-storytelling, process automation, and FoF technology. Moreover, these theses concerned some aspects of product-service system concept and risk management. Theses have been coordinated by Arkadiusz Jurczuk and Alicja Gudanowska.

Table 5.4. UNIBIAL thesis for companies in the scope of chosen FoF aspects

Item	Thesis Type	Student Name	Project title	Year	Target companies
1	Bachelor	Patryk Żbikowski	Concept for digitizing the process of daily data exchange of the rail freight of Barter Inc.	2020	Barter Inc.
2	Engineering	Krystian Siemieńczuk	Project of automation of selected processes as an element of improvement of operational activity of logistic companies	2020	
3	Engineering	Ola Dzięgielewska	Improving data identification using RFID technology in selected manufacturing company	2021	polymer processing company

Item	Thesis Type	Student Name	Project title	Year	Target companies
4	Engineering	Weronika Zimińska	The use of selected Lean Management tools in designing a production workstation in Danwood company	2021	Danwood S.A.
5	Engineering	Katarzyna Kuszniercuk	Proposal for improvement of production logistics with the use of Kanban method in Multi Packaging Solutions Bialystok	2021	Multi Packaging Solutions Białystok
6	Engineering	Sylwia Krakowiak	Product-service system concept for a semi-automated retail store	2021	
7	Engineering	Anna Sieńko	Identification of risks associated with the implementation of the Industry 4.0 concept in a manufacturing company	2021	BND Light
8	Engineering	Gabriela Mikołajczuk	Application of 3D printing technology in industrial production	2021	Pronar

6 UNIOULU joint academy-industry action

In follow actions carried out by UNIOULU partner in period 01.2019-10.2021 in the DigiFoF project are presented. Activities in the reported period referred to two groups of project tasks - webinars and lectures in academia.

6.1 Online and face-to-face trainings and Webinar

Members from UNIOULU contribute at one webinar in the 2019 year, as was in proposed plan:

1. In 07.10.2019 webinar #2 with name "Introduction and research interest of each Laboratory" where Juha Röning and Xiaowen Wang presented the general idea that will be integrated and develop in the white paper for this project.
2. In 13.05.2020 webinar #12 "Using conceptual modelling for automatisation in chemistry laboratory".

6.2 Lectures (series) in academia and industry

In 2019 UNIOULU has 1 lecturer that participated at NEMO 2019 on the 17.07.2019 giving a lecture on "Collaborative and well-behaved outdoor robots in harsh environment".

6.3 Invited talks both in academic and industrial settings

On 13.03. Biomimetic and intelligent systems group of Oulu university hosted AI & ROBOTICS BUSINESS EVENT for companies developing or utilising autonomous technology, AI and robotics. Speaks given in the event included:

Lecture name	Speakers	Company
Opening	Juha Röning	University of Oulu
Open Infra BIM integrated Autonomous Excavator	Rauno Heikkilä	University of Oulu
GOF U-space project, Urban Air Mobility"	Jonas Stjernberg	
Robotics in the future rural transportation system	Rune Storvold Research	Director at NORCE "
Digital platform for U-space, opportunity for Drone business to grow	Pasi Nikama	SPV Marketing & customer relations
UAVs and Next Generation mobile networks	Richard Wiren	Ericsson
The challenges for autonomous and unmanned aircraft in the high north	Kim Lynge	UBIQ Aerospace

On 10.11-12.11. University of Oulu hosted CriM 2020 Cyber Security Seminar and Workshops. Due to the COVID epidemic situation, the event was held online with speakers, delegates and students participating in the event remotely. The international

Crisis Management workshop CriM gathers the teachers, researchers, experts and students of cybersecurity annually to study pressing issues of security and privacy of our digital systems. Respected international and Finnish lecturers combined with practical workshops each day bring the important insights of the current world to students interested in cybersecurity. 2020 CriM focused on the NEXT GENERATION INTERNET and its challenges. Speakers talked about cybersecurity issues and legislative problems but also projects around the world tackling these issues. In addition to lectures, students also got to test their skills in practical workshops organized each day. The students were also awarded 5 ECTS for participating and completing all the assigned tasks for each of the lectures and workshops. Lectures given during event included:

Lecture name	Speakers
Start lecture	Juha Röning
Digital forensic in enterprises	Ludwig Englbrecht
Cybersecurity in light of legislation	Gerald Quirchmayr
The challenge for managing security requirements for Ot environments	Markku Tyynelä
Cybersecurity presentation	Kimmo Halunen
The cost of Cybersecurity breached	Steven Funell
Cybersecurity presentation	Gabriela Limonta
Trusted computing	Ian Oliver
Secure critical infrastructures	König Sandra
Running infosec tools securely using containers and cincan	Rauli Kaksonen

Workshops organised during CrimM 2020 were about cyberrange, trusted computing and cyber forensic.

6.4 Bachelor, Master, PhD thesis project

University of Oulus Biomimetics and Intelligent Systems groups Robotics group studies and develops methods, theories, sensors and platforms for creating mobile robots that are adaptive and capable of performing purposeful tasks in cooperation with humans. Robotics research activity at BISG includes collaboration with processing industry. Projects done in cooperation with industry don't always lead directly to thesis but value is generated in knowledge gained during projects. Some projects developed in collabration with industries during 2019 and 2020 include:

- **EAKR - Labrobot** – Developing food industry with robotics in collaboration with Luonnonvarakeskus Luke, Probot Oy, Mekitec Oy, Maustaja Oy, Kinnusen Mylly, Yaskawa Finland and Oy Katri Antell Oy

- **HYFLIERS** – Oil refinery pipe inspection with flying drones in collaboration with University of, University of Seville (Spain), Chevron Oronite (France), Total (France), Consorzio di Ricerca per l'Energia e le Tecnologie dell'Elettromagnetismo C.R.E.A.T.E. (Italy), Advanced Center for Aerospace Technologies FADA-CATEC (Spain), General Electric Inspection Robotics (Switzerland) and, DASEL sistemas (Spain)
- **EAKR Garbot** – Utilizing robotics and AI for material recycling with Suomen ympristökeskus, Oulun energia, Vimelco and Kiertokaari.,
- **EAKR Geobot** – Utilizing robotics for geopolymer manufacturing in collaboration with Oulu University of Applied Sciences, Saint-Gobain S.A. Keliber Oy and Boliden AB.

7 BOC joint academy-industry action

In follow we will present actions carried out by BOC partner in period 01.2019-12.2019 in the DigiFoF project. Some of actions was planned and described already in the deliverable D5.1 because the deliverable D5.1 was prepared at the end of the year, according to the planning, and already some of the actions were being carried out.

7.1 Online and face-to-face trainings and Webinar

BOC coordinated the development of webinars done by other consortium members as well as created two webinars, as it was in proposed in the action plan:

1. On 18.09.2019 – a webinar #4 with name "DigiFoF webinar 4 - FoF design with ADOxx" in which Zbigniew Misiak explained how ADOxx platform can be used to design FoF
2. On 16.10.2019 – a webinar #5 with name "DigiFoF webinar 5 - How to set up Olive based portal and brokerage" in which Zbigniew Misiak explained presented the current development of Olive platform, including instruction on how to properly setup this platform.
3. On 13.11.2019 – a webinar #6 with name "Design thinking with Scene2Models" presented by Michael Walch, in which explain how Science2Model can be used to design FoF.

8 OMiLAB joint academy-industry action

In this chapter, the actions carried out in the DigiFoF project by OMiLAB NPO in the period from January 2019 until September 2021 are presented.

8.1 Online and face-to-face trainings and Webinar

In the reporting period, OMiLAB NPO contributed the following webinars:

1. The webinar #3 “Introduction and requirements for OMiLAB” was presented by Wilfrid Utz on the 04/09/2019. In this webinar, the OMiLAB Laboratory was introduced and the physical as well as the technical requirements for setting up an OMiLAB were explained.
2. The webinar #7 “Flowchart and Petri net steering with BeeUp” was presented by Wilfrid Utz on the 11/12/2019 explaining the modelling languages flowchart and Petri net using the BeeUp software tool.
3. The webinar #19 “Simulating Event Logs in Production Processes” was presented by Anna Sumereder on the 08/03/2021 explaining the simulation capabilities within Bee-Up to generate production process logs.
4. The webinar #21 “Domain Specific Intelligent Assessment Services” was presented by Patrik Burzynski on the 28/06/2021 explaining the intelligent assessment services in cloud-based environments.

In addition to the webinar series organized by DigiFoF, OMiLAB organized and run the following training sessions as part of the global community awareness initiatives

1. OMiLAB Day on 25/09/2020: attracting participation and presentations from the network of nodes. Further details are available online at https://www.omilab.org/activities/events/omilabday2020/
2. NEMO Day on 29/01/2021: organized as an alternative format for NEMO 2020, the NEMO Days are established. The first event featured talks by ULBS, EMSE and OMiLAB (further details online at https://www.omilab.org/activities/events/nemoday2021/)
3. NEMO Day on 16/04/2021: organized as an alternative format for NEMO 2020, the NEMO Days are established. The second event featured talks by ULBS, UNIBIAL, OMILAB. (further details online at https://www.omilab.org/activities/events/nemoday2021_april/)
4. NEMO Day on 14/05/2021: organized as an alternative format for NEMO 2020, the NEMO Days are established. The third event featured talks by ULBS, FHNW (external to DigiFoF), UNIBG, UNIOULU. (further details online at https://www.omilab.org/activities/events/nemoday2021_may/)

The NEMO Days are observed and evaluated by DigiFoF partners as input for the evaluation stream in WP5.

8.2 Lectures (series) in academia and industry

On the 19/07/2019, during NEMO summer school, Wilfrid Utz presented this EU project DigiFoF to the participants of the summer school. The presentation covered the

motivation for the project, the purpose of the project, including the concept, the objectives as well as project facts and figures and concluded with an outlook.
During the 7th edition (2021) of NEMO, 2 talks of DigiFoF partners have been included in the programme. Further details are available online at https://nemo.omilab.org/. NEMO 2021 was organized as a virtual event with 253 registrations of students and 30+ lectures given between July 19, 2021 - July 30, 2021. Details on the programme can be found online at https://nemo.omilab.org/2021/ .

9 IDPC joint academy-industry action

Activities carried out by IDPC in the reported period refer to two groups of project tasks - invited talks and internships. All actions have been described in the action plan (deliverable D5.1).

9.1 Invited talks both in academic and industrial settings

IDPC Poland provides the three actions in the scope of this set of project tasks. They aimed at presentation of fundamental aspects of Industry 4.0.

Table 9.1. IDPC invited talks in the reported period

Item	Presenter	Topic	Event and Date	Company
1	Sebastian Rynkiewicz	On the Way to Industry 4.0	November 2019	University of Bialystok / Faculty of Mechanical Engineering
2	Sebastian Rynkiewicz	Competent success factors of the industry of the future	April 2019 Congress of Leaders of Change	The University of Finance and Management
3	Sebastian Rynkiewicz	EU funds after 2020 - possibilities, needs, potential effects. Education and new competencies. Universities versus soft regional projects	September 2019 6th Eastern Economic Congress	Bialystok 6th Eastern Economic Congress

9.2 Internships (e.g. Erasmus+ / student internships)

Internships coordinated by IDPC were addressed mainly to UNIBIAL students and teachers. In the reported IDPC provides the following actions.

Table 9.2. Internships cooordinated by IDPC

Item	Student Name	Specialization	Year study	Start date	Organising Company
1	Karolina Ślinko	Biomedical engineering	Final year of engineer	VIII – IX 2019	Rotational internships in companies : FERROX Ltd. Samasz Ltd. ChM Ltd Metalfach Ltd.
2	Adrian Lotkowski	Electronic and telecommunications		VIII – IX 2019	
3	Rafał Tarasaewicz	Mechatronics		VIII – IX 2019	
4	Kamil Żukowski	Management engineering		VIII – IX 2019	
5	Karol Rzemieniecki	Mechatronics		VIII – IX 2019	
6	Adrian Kaczmarek	Mechanics		VIII – IX 2019	
7	Sandra Romaniuk	Mechanics		VIII – IX 2019	
8	Paulina Nikołajuk	Biomedical engineering		VIII – IX 2019	
9	Barbara Chojnowska	Mechanics		VIII – IX 2019	

10 CONTI joint academy-industry action

In follow we will present actions carried out by CONTI partner in period covered by this report in the DigiFoF project.

10.1 Online and face-to-face trainings and Webinar

1. In 28.10.2020 webinar #16: "Cobots - Rapid implementation of Cobots in industrial environment" was presented by Cosmin Moga and Cristian Mihutoiu from the CONTI Company.
2. In 18.11.2020 webinar #17:"AGV for modern Logistics in industrial companies" was presented by Cosmin Moga and Cristian Mihutoiu from CONTI.

10.2 Invited talks both in academic and industrial settings

In 18-22 October 2021 have took place at the Continental the event "S**trategic project – Sibiu is Speaking Digitalization"** where was organised a lot of workshops by employers of Continental, ULBS and Microsoft. The panels and presentations are related to DigiFoF project objective.

The detailed program is on CONTI_DIGITAL WEEK AGENDA 2021.pptx

11 Summary of academia-industry initiatives

DIGIFoF partners in the reported period organized 23 webinars on project, 3 NEMO Crush Course in 2021, 1 webinar in French language and some trainings for professionals, students and teachers as well. Furthermore, project members contributed and gave more than 35 lectures and talks for academics, representatives of enterprises, training institutions and local/regional authorities. Thanks to the strong cooperation in DIGIFoF academia-industry network including HEIs and manufacturing sector it was possible to organize 70 internships in first year but only 19 in the second year and 23 in last year because of restrictions due to COVID-19 period. Also, the excursions start very well in the first year and stop in the last 2 years. Project partners coordinated more that 150 Bachelor, Master and PhD thesis project related to fundamental aspects of Factory of the Future. This confirms the high utilitarian potential of the diploma thesis and the ability of the HEI-industry to work together efficiently in the field of FoF.

Synthesis of all activities carried out by DIGIFoF partners in the reported period (separate for each year) are given in the table below.

Table 11.1. Summary of academia-industry initiatives

Type of activity	Achieved result 2019	Achieved result 2020	Achieved result 2021
Online and face-to-face trainings and Webinar	**15**	**16**	**15**
Lectures (series) in academia and industry	**18**	**24**	**33**
Invited talks both in academic and industrial settings	**19**	**33**	**15**
Internships (e.g. Erasmus+ student internships)	**70**	**19**	**23**
Bachelor, Master, PhD thesis project	**47**	**56**	**48**
Excursions (lab visits, industrial visits etc.)	**6**	**2**	**2**