



619130-EPP-1-2020-1-FR-EPPKA2-CBHE-JP

Selection: 2020

KA2 – Cooperation for innovation and the exchange of good practices –
Capacity Building in the field of Higher Education

**str~~EN~~gthening skills and training expertise for Tunisi~~AN~~
and Moroc~~CA~~n transition to industry 4.0 Era / *ENHANCE***

D5.1. Project Management, Quality and Risk Plan

Deliverable Identifier	D5.1
Deliverable Date	M18 – 15/07/2022
Deliverable Version	V 1.4 - 2022
Deliverable Leader	ULL
Deliverable participants	All
Dissemination Level	Public

Document Control Page

Title	Project Management, Quality and Risk Plan
Version	V1.4 - 2022
Deliverable number	D5.1
Work-Package	WP5
Status	<input type="checkbox"/> Draft <input type="checkbox"/> Under Review <input type="checkbox"/> Under Update <input type="checkbox"/> Accepted by the coordinator <input checked="" type="checkbox"/> Submitted to the commission
Authors	Nejib Moalla (ULL)
Contributors	All partners
Peer Reviewers 1:	
Assigned Date	
Received Date	
Peer Reviewers 2:	
Assigned Date	
Received Date	
Date of Delivery	
Dissemination level	<input checked="" type="checkbox"/> Public <input type="checkbox"/> Confidential, only for ENHANCE Consortium (including EC) <input type="checkbox"/> EU-Restricted

Version History

Version	Date	Description	Edited by
1.0		Initial Version	
1.1		Draft for Consortium sharing	
1.2		Final Draft with integration of comments from reviewers	
1.3		Final Version	
1.4		Submitted to the commission	

Executive Summary

This deliverable proposes different solutions to ensure ENHANCE deliverables quality:

- The first deals with an agile approach in training activities development
- The second proposes rules to perform internal reviews
- The next presents a complete procedure to select external reviewers
- The last provides the updated list of risks at M18.

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1. Introduction

ENHANCE – strENgtHening skills and training expertise for TunisiAN and MorocCan transition to industry 4.0 Era – is an Erasmus Plus project founded under the KA2 Cooperation for innovation and the exchange of good practices (Capacity Building in the field of Higher Education) programme by the European Commission under Grant Agreement N° 619130, to be conducted in the period January 2021 until January 2024. It engages 7 partners from 5 countries with a total budget of 779k€. Further information can be found at <http://eplus-enhance.eu/>.

The emergence of industry 4.0 concepts and applications brings new paradigms impacting all the industrial business domains when they need to conduct successful digital transformations or increase workshops connectivity. The evolution of Maintenance, Production and Quality Engineering (MPQ 4.0) represents the main application domains where Industry 4.0 produces effective beneficial results.

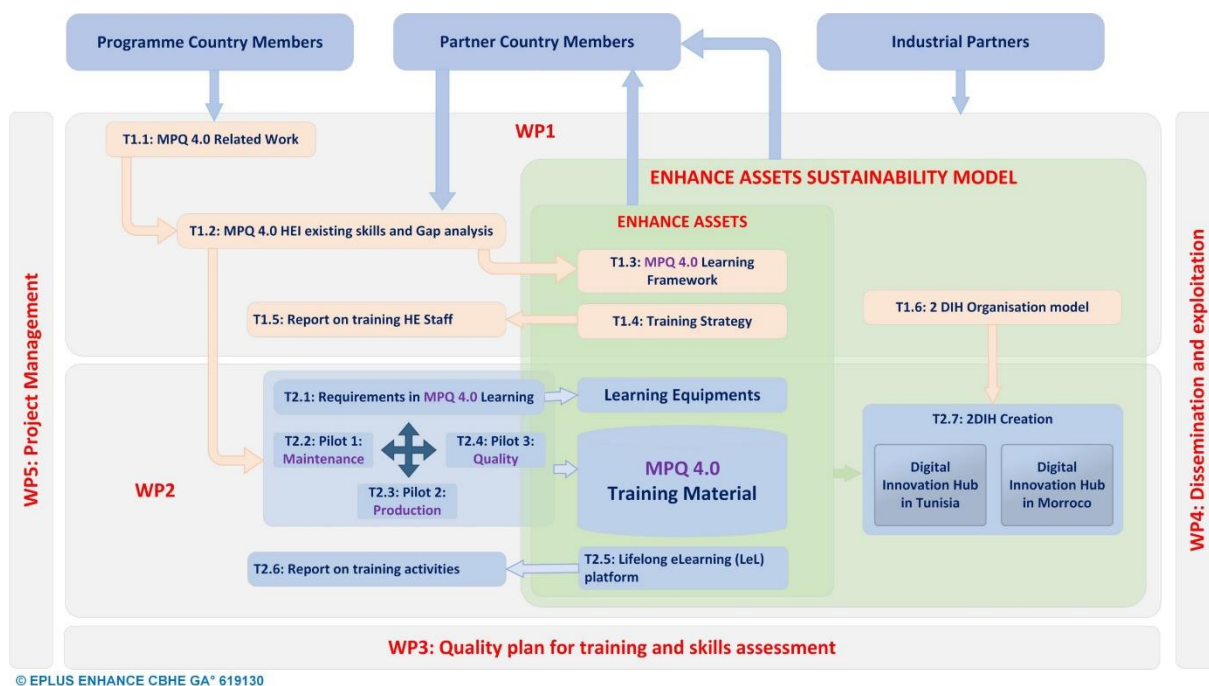


Figure 1. ENHANCE project organization.

The ENHANCE project focuses on building new MPQ training capacities at Higher Education Institutions (HEI) in Tunisia and Morocco to establish interactions between the following stakeholders:

- European universities and research institutions (from France, Germany and Portugal) confirmed MPQ 4.0 competencies, training materials, collaborative research projects, full operational Digital Innovation Hubs (DIH), technology transfer experiences, etc.
- Partner country universities (from Tunisia and Morocco) with teaching and training activities in MPQ and existing connections with their local industrial partners.

The ENHANCE project will create several outputs and two primary tangible outcomes:

- New MPQ 4.0 equipment and training materials developed in connection with the existing training programmes and consolidated through three industrial pilots. The new material will be used to train the trainers and the students in the different partner country universities.
- Two DIHs, one in Tunisia and one in Morocco to sustain the project outcomes through their reuse for training in industry.

ENHANCE aims to become the reference model for creating effective and sustainable training material for MPQ 4.0 in both partner countries with content approved by academia and industry.

1.1. Purpose of the document

This deliverable is part of the work-package 5 (Management). It presents an update of some project management rules, deliverables quality assurance rules, the procedure to select external reviewers. The document proposes an updated list of risks at M18.

1.2. Reference documents

This document is related to the deliverable 5.3 about Project quality and risk management guidelines.

1.3. Applicability

NA

1.4. Definitions

NA

1.5. Structure of the document

This document is organised in 4 sections:

1. Introduction
2. Project Management for deliverables quality assurance
3. External reviewers' selection procedure
4. Risks list update at M18
5. Annexes

1.6. List of acronyms

MPQ: Maintenance, Production, Quality.

TT: Train the Trainers

RP: Reporting Period

2. Project Management for deliverables quality assurance

During the development of WP1 (preparation) tasks and related deliverables, the requirements of the eight training programmes in Tunisia and Morocco were analysed to identify the set of activities and related skills, and technologies needed to upgrade the existing training materials. An agile methodology was adopted to conduct the development of the selected 42 training activities. Internal and external reviewing processes are proposed to ensure the quality of the proposed content for all the project deliverables.

2.1. Agile methodology for training activities development

As presented in D1.4 and D1.5, the ENHANCE project will contribute to create 42 training activities organised through the 3 project pilots (Maintenance, Production, and Quality). The proposed activities are selected according to the partner countries' needs (D1.5) and developed equally between the 7 ENHANCE partners in coherence with their competences. The following table summarises this repartition.

Table 1: Activities repartition per partners

Partner	Nbr of MPQ Activities in Courses 1, 3, 5	Nbr of MPQ Activities in Courses 2, 4, 6	Nbr of MPQ Activities in Use Case 1, 2, 3	Nbr of MPQ Activities per partner
ULL	3		3	6
BIBA	2	1	3	6
UNL	1	2	3	6
UCAR	2	2	2	6
IIT	3	3		6
ECC	2	3	1	6
UIT	2	3	1	6
	15	14	13	42

The following table summarizes the selected activities per pilot (Maintenance, Production, and Quality), and per ENHANCE partner in charge of their development.

Table 2 : Selected activities per pilot and per partner

Maintenance 4.0	Course/Use case		Partner in charge of the development of the activity							Consumption during TT sessions				Activities Consumption
			ULL	BIBA	UNL	UCAR	IIT	ECC	UIT	IIT	UIT	UCAR	ECC	
	Course 1: Advanced Maintenance strategies	Act 1.1 Use cases of extended Reality (XR) in Smart Maintenance 4.0 contexts							X				X	1
		Act 1.2 Sensor Network Design in Smart Maintenance 4.0 contexts		X							X	X	X	3
		Act 1.3 Failure Modes, Effects & Criticality Analysis (FMECA) in Smart Maintenance 4.0 context	X							X			X	2
		Act 1.4 Contributions of Smart Maintenance 4.0 to Energy Management & Energy Efficiency of Industry 4.0 Assets						X			X	X		2
		Act 1.5 Sustainability Driven Smart Maintenance 4.0			X								X	1
	Course 2: Integrated maintenance planning	Act 2.1 Data-Driven Reliability for Smart Maintenance 4.0						X					X	0
		Act 2.2: Maintenance planning and scheduling		X						X	X	X	X	4
		Act 2.3 Contributions of Industry 4.0 technologies to Total Productive Maintenance						X				X		1
Act 2.4 Downtime forecast and optimal maintenance planning				X					X	X		X	3	
Act 2.5 Industry 4.0 Asset & Maintenance Management Systems							X				X		2	
Use case 1	Act U.1.1 Real-time communication			X								X	1	
	Act U.1.2 Data acquisition and storage in Industry 4.0				X						X	X	2	
	Act U.1.3 ML and application for maintenance	X							X	X	X	X	4	
	Act U.1.4 KPI, Dashboarding and data visualisation		X									X	1	
Course/Use case		Partner in charge of the development of the activity							Consumption during TT sessions				Activities Consumption	
		ULL	BIBA	UNL	UCAR	IIT	ECC	UIT	IIT	UIT	UCAR	ECC		
Production 4.0	Course 3: Production planning, scheduling and control in industry 4.0	Act 3.1: Design and development of smart Production Planning/Scheduling systems				X				X			X	2
		Act 3.2: Planning and scheduling techniques and approaches in industry 4.0							X	X	X	X		3
		Act 3.3: Methods and frameworks for control systems in agile manufacturing						X			X			1
		Act 3.4: Data-driven planning/scheduling models and algorithms						X					X	2
		Act 3.5: Big data and predictive inventory analytics			X					X		X	X	3
	Course 4: Factory 4.0 Concepts, techniques and application	Act 4.1: PLM and Digital Factory						X			X			1
		Act 4.2: VSM for production 4.0				X				X	X	X		3
		Act 4.3: Virtual Reality for simulation									X			1
		Act 4.4: KPI, Dashboarding and data visualisation				X				X	X	X		3
		Act U.2.1 Emerging uses of smart technologies for production planning and scheduling						X		X	X		X	3
Use case 2	Act U.2.2 Horizontal and vertical integration & Workflow management						X						0	
	Act U.2.3 CPS design and development		X						X	X			2	
	Act U.2.4 Data-driven inventory management			X							X	X	2	
	Act U.2.5 Digital control systems (DCS)						X		X		X		2	
Course/Use case		Partner in charge of the development of the activity							Consumption during TT sessions				Activities Consumption	
		ULL	BIBA	UNL	UCAR	IIT	ECC	UIT	IIT	UIT	UCAR	ECC		
Quality 4.0	Course 5: Advanced PSS Quality Design	Act 5.1: Integrated thinking system modelling and development						X			X	X	X	0
		Act 5.2: Non-Conformities RCA and Quality gates design	X							X	X			3
		Act 5.3: QC model design	X								X			2
		Act 5.4: Design for X applied for Quality				X							X	1
		Act 5.5: IoT and BPM for Integrated VSM				X							X	1
	Course 6: QC analytics for Zero defect manufacturing	Act 6.1: Integrated process improvement				X							X	0
		Act 6.2: Quality Process maturity self-assessment and lifecycle management							X			X		1
		Act 6.3: Inspection Methods, sampling, Inspection Plan						X						0
		Act 6.4: Prescriptive and adaptive decision for Quality Control				X							X	1
		Act 6.5: Quality Planning, Control and Management functions											X	0
Use case 3	Act U.3.1 Sensors sensitivity analysis and selection	X							X	X			2	
	Act U.3.2 Non-Conformities RCA and Quality gates design	X									X		1	
	Act U.3.3 IoT and BPM for Integrated VSM								X	X	X		3	
	Act U.3.4 Process maturity self-assessment and lifecycle management												0	
	Act U.3.5 Prescriptive and adaptive decision for Quality Control			X						X		X	2	
		6	6	6	6	6	6	6	18	18	17	20		
Activities developed per each partner														
Activities consumed per each Train the Trainers session														

At M21, the status of the training activities can be summarised as following:

- Activities marked in **green** are ready to be consumed by the partners, in the train of the trainers' sessions, and in the upgrading of the existing 8 programmes in PC.
- Activities marked in **blue** are under development, already presented internally among the project members, and still in development to be finalised according to the recommendations of the Learning Framework.
- Activities marked in **red** are not yet developed.

All the project partners commit to finalise their training activities before their consumption in the train the trainers' sessions.

To increase the interaction between ENHANCE partners during the development of the selected activities, an agile methodology was conducted. The following figure summarizes the conducted process during the first 18 months of the project.

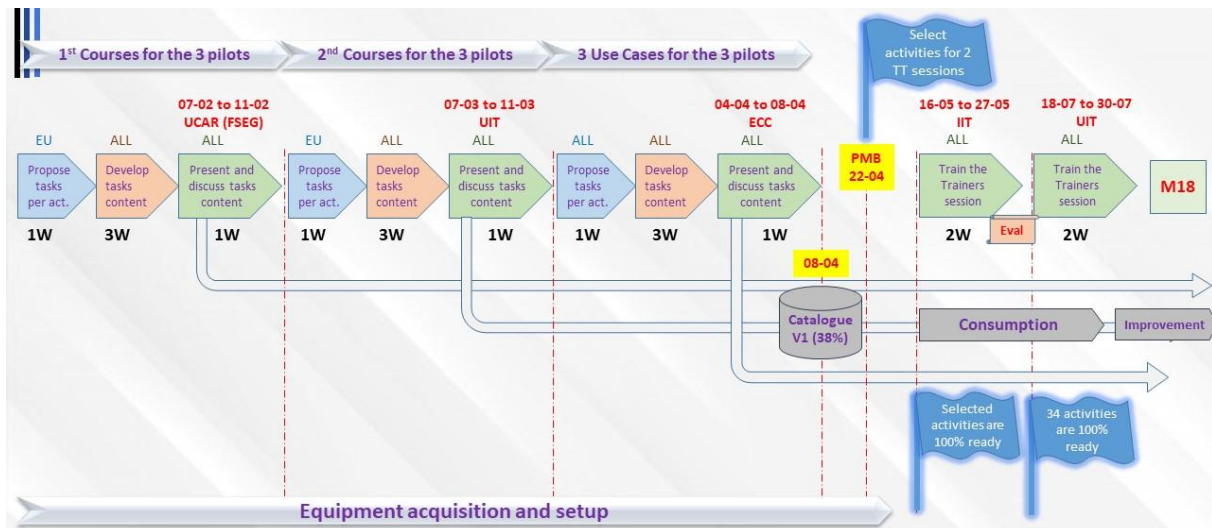


Figure 2: Activities development process during the first reporting period

First, EU partners are invited to propose the set of tasks to be developed in each activity. After discussion, the activity is assigned to the right partner. Next, each activity content is developed and presented between the project partners to discuss and validate its content. At the last iteration, each activity content is organised according to the Learning Framework template proposed in D1.3.

During the two train the trainers' (TT) sessions organised by the IIT partner in Sfax - TN (between 16 and 27 May 2022) and then by the UIT partner Kenitra – MA (between 18 and 30 July 2022), all the activities content were 100 % released.

Additional improvement activities are planned after the TT sessions, the training of the students' sessions and the train of the industrial resources in each partner country. The following figure summarises this continuous improvement process. The training session evaluation template is proposed in the annexe (annex 1) of this document.

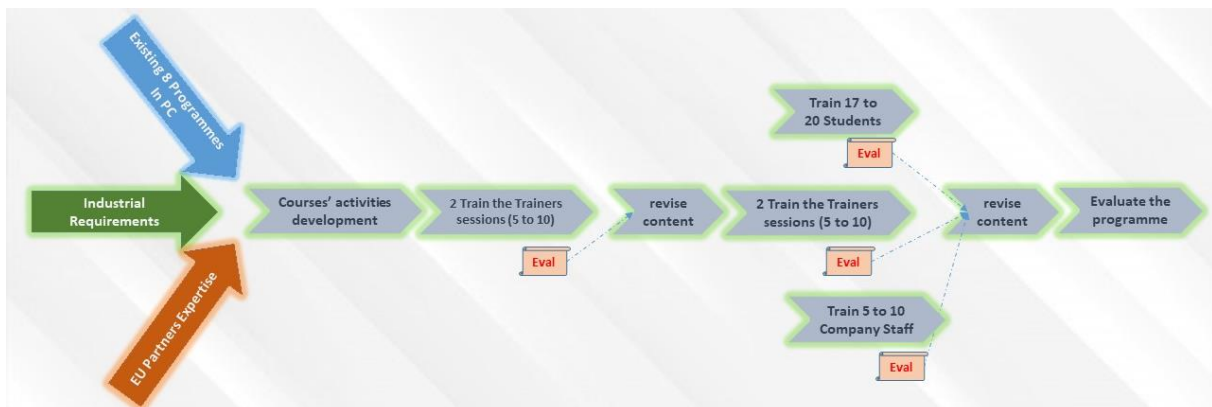


Figure 3: Continuous improvement process of developed training activities

3. Guideline for internal deliverables' reviewing process

During the timeline of the ENHANCE project, 35 deliverables are planned to be released (19 in RP1 and 16 in RP2). To increase the quality of the project outcomes, each deliverable is reviewed internally by two partners. The leader of each deliverable is invited to consider the proposed remarks after each review iteration. The scientific coordinator as well as the project coordinator follow the applicability of this process. The template for the reviewing process is organised as following:

- Reminder of the reviewing objective

- Reviewing procedure and requested action's types
- Deliverable initial objective
- Deliverable achieved results summary
- Reviewer presentation (short CV)
- Reviewing process dates
- Reviewing recommendations

Each reviewer was invited to organise his/her recommendations using the following table.

Table 3: Reviewing template

Location in the deliverable	Recommendations	Requested action's types	Proposed answers

The external reviewer is invited to use the same template. Additional information about the external reviewers' selection is presented in the next section.

4. External reviewers' selection procedure

4.1. Reviewers' identification

Each ENHANCE partner was invited to propose the CV of 1 to 2 external reviewers. Each partner selection of external reviewers should respect the following rules:

- Not a member of the partner organisation
- Not an external teacher or expert in the partner organisation
- The background (publications, projects, etc.) of the candidate in relation with industry 4.0 topics
- No common scientific publications in the last 10 years
- No common supervising activities in the last 10 years

4.2. Additional eligibility criteria

- Experience or scientific publications with solid connexion with Industry 4.0
- Technical skills related to industry 4.0
- Experience to develop projects with industry
- Topics of the last 10 years publications (restriction to scientific researchers)

4.3. List of reviewers proposed by ENHANCE partners

The following table provides a short presentation of external reviewers presented by the ENHANCE partners.

Table 4: External reviewers list

Partner	Proposed Reviewer Name	Reviewer's Short CV
ULL	Mr. András Gabor (HU)	is a professor (since 2002) and former member of the information systems department from Corvinus University in Budapest for 33 years. From the beginning of the 1990s, Andras took part in several national and European projects in the fields of knowledge engineering, the analysis and evaluation of information systems and the design of intelligent systems. He had several stays in universities and laboratories abroad. His research is valued in several international journals and conferences recognized in our community. Mr. András Gabor is the external reviewer for the E+ CBHE TETRIS where Lyon 2 is a partner.
	Mr. Sergio Terzi (IT)	After a degree in Economics (from University Carlo Cattaneo in Castellanza), Sergio got his PhD in Management Engineering at Politecnico di Milano in 2005, discussing a thesis on Product Lifecycle Management, in co-tutorship with the French University of Lorraine (CRAN Laboratories, from Nancy). Since 2005 till 2014 he served as Researcher at the University of Bergamo, then he moved as Associate Professor in Politecnico in November 2014. Since 2016, at MIP Graduate School of Business he is the Director of the Management Academy, as well as the Director of the Executive Program in Industry 4.0. Within SoM, he is also co-director of the national Observatory Industria 4.0. M. Sergio Terzi is member of the project E+ CBHE NePRev
BIBA	Mr. Sami Trimech (TN)	49 years old, Telecommunication Engineer and Master in International projects engineering. 2015- to Date: Director of Strategic Planning and Development – Arab ICT Organization, in charge of the development of new ICT

		<p>initiatives and development projects in the region, of technical assistance missions planning, of capacity building program development, AICTO events coordination. More globally in charge of ICT public policy reforms advice, of design and implementation of AICTO action plans for the region. In charge of the coordination with all parties: governments, public and private institutions, international organizations, and sponsors.</p> <p>In 2017; He was nominated by the Tunisian Government as the President of the National Committee in charge of the organization of the ITU -World Telecommunication Indicator Symposium - WTIS</p> <p>2012- 2015: Director of International Development –STUDI/ST2I – Group – Tunisia. He was in charge of the Business development of the Group ICT subsidiary in both regions: Africa and Arab.</p> <p>2006-2011: Director of International Cooperation – Research and Studies telecommunication center – CERT - Tunisia</p> <p>2004-2005: Program Officer – Executive Secretariat of the World Summit on Information Society -WSIS- Tunis phase. Among others, in charge of Stocktaking activity, NGOs and Business companies Accreditation, Internet governance follow up - International Telecommunication Union –ITU, Geneva – Switzerland</p> <p>1997-2003: Progressing responsibilities within the Research and Studies telecommunication center – CERT – Tunisia. He started as a telecommunication junior consultant, promoted to technical acceptance project manager, and promoted finally to satellite technologies studies unit head.</p> <p>https://www.linkedin.com/in/sami-trimech-69277910/</p>
	Mr. Sergio Terzi (IT)	<p>After a degree in Economics (from University Carlo Cattaneo in Castellanza), Sergio got his PhD in Management Engineering at Politecnico di Milano in 2005, discussing a thesis on Product Lifecycle Management, in co-tutorship with the French University of Lorraine (CRAN Laboratories, from Nancy). Since 2005 till 2014 he served as Researcher at the University of Bergamo, then he moved as Associate Professor in Politecnico in November 2014. Since 2016, at MIP Graduate School of Business he is the Director of the Management Academy, as well as the Director of the Executive Program in Industry 4.0. Within SoM, he is also co-director of the national Observatory Industria 4.0.</p> <p>M. Sergio Terzi is member of the project E+ CBHE NePrev</p>
UNL	Mr. Gash Bhullar (UK)	<p>Gash Bhullar is the Managing Director of Control 2K Limited and Sematronix in UK. He participates in several EU collaborative projects and developed strong connections with industry and related associations (EFFRA, Interop Vlab, etc.). His research interest domains are data connectivity, digitalisation, connected factories, artificial intelligence, etc.</p> <p>https://www.linkedin.com/in/gashbhullar</p>
	Mr. Carlos Coutinho (PT)	<p>Carlos Coutinho is the CEO of Caixa Mágica Software. He has a long experience as software engineer with several experiences as project leader and quality manager. He got his PhD in 2013 and participated in several European projects as technical contributor and technical leader.</p> <p>https://www.linkedin.com/in/carloscoutinho/</p>
IIT	Mr. Bassem Hichri (TN)	<p>Bassam Hichri is a doctor of University graduated from Blaise Pascal University in Clermont-Ferrand (France) and a mechatronic engineer specialized in robotics, mechanical and mechatronic systems modelling and design.</p> <p>He is actually a European scientific project manager and chef engineer of the robotics team within the manufacturing group in Luxembourg</p>

		University. His fields of research are : industrial robotics, 3D printing based on metallic wires, systems control, Automation, Mechatronic design, Big Data, IT, Industry 4.0. https://lu.linkedin.com/in/bassem-hichri-75271432
	Mr. Faicel Hnaïen (TN)	Faïcel Hnaïen is an associate professor at University of Technology of Troyes. He is a doctor of University graduated from MINES Saint-Etienne and Industrial Engineer. His teaching activities are: Project Management, Operation research, Production research management, Simulation, Scheduling and SAP. His fields of research are: Supply chain, Production systems, Wireless Sensor Network, Inventory management, Artificial Intelligence, Lean Manufacturing and Industry 4.0. https://fr.linkedin.com/in/faicel-hnaïen-909b5645
UCAR	Mrs. Nesrine Zoghliami (TN)	Pr. Nesrine Zoghliami is a professor in industrial computer science and the dean of preparatory institute for engineering studies at University of Tunis El Manar. She is involved in different European funded projects (Horizon 2020 Intra Afrique Mobility Program and Erasmus+). She is the coordinator of a Horizon 2020 Intra Afrique Mobility project. With regards to ENHANCE topics, Pr. Zoghliami worked on different Artificial Intelligence and Big Data techniques to solve logistics and manufacturing systems problems.
	Mrs. Hanen Bouchriha (TN)	Pr. Hanen BOUCHRIHA is a professor in the industrial Engineering department of the National Engineering school of Tunis (University of Tunis-Manar) and the dean of the doctoral school of ENIT. She is a member of the research laboratory « Laboratoire Analyse, Conception et Commande des Systèmes ». Her main research topics are related to human resource management, emergency management, and vehicle routing. With regards to the project topics, she published many articles related to the problem of joint optimization maintenance, production and quality.
ECC	M. Malek Masmoudi (UAE)	Malek Masmoudi is a Full Professor of Industrial Engineering at Université Jean-Monnet, Saint-Etienne, France. He is also an associate professor of Industrial Engineering at University of Sharjah, College of Engineering, Sharjah, UAE. His research activities deal with optimizing warehousing, discrete event simulation, flow shop scheduling, machine learning for predictive maintenance, etc. https://scholar.google.fr/citations?user=BVuj5o4AAAAJ&hl=fr
	M. Jawhar Ghommam (OM)	Jawhar Ghommam is a professor at College of Engineering, Dept. Electrical and Computer Engineering, Sultan Qaboos University, Oman and associate researcher at ETS Canada. His research deals with distributed control, adaptive tracking control, model-based switching functions, etc. https://scholar.google.ca/citations?user=MrumQIEAAAAJ&hl=en
UIT	M. Oualid Kamach (MA)	Oualid Kamach is a Full Professor in Industrial engineering & Logistics at ENSA of Tangier, University ABDELMALES ESSAADI, Morocco. His research activities deal with supply chain optimization problems, Manufacturing Execution Systems (MES) selection using deep neural networks, Cyber-physical system modelling, etc. His contributions cover algorithms and models for optimisation modelling as well as decision supports systems. https://www.researchgate.net/profile/Kamach-Oualid
	M. Jaouad Dabounou (MA)	Jaouad Dabounou is a full professor at the FST of Settat, University Hassan 1 st . He is the head of the research team Mathematics, Computer science, and Applications. His research activities cover territorial intelligence, territorial strategy, territorial information system, etc. https://ma.linkedin.com/in/jaouad-dabounou-12874b36

M. Abdellah El Barkany (MA)	<p>Abdellah El Barkany is a professor (since 1998) at the Faculty of Science and Technology of Sidi Mohamed Ben Abdellah University (USMBA) of Fez. He is director (since 2020) of the Mechanical Engineering Laboratory of the Sidi Mohamed Ben Abdellah University of Fez. He is an engineer in quality control and maintenance graduated from the National School of Electricity and Mechanics (ENSEM) of Casablanca in 1997. He is also a doctor in mechanics applied to the construction of the ENSEM of Casablanca in 2007. He has more than 20 years of experience in Higher Education and Scientific Research. Abdellah El Barkany has given several training courses in Moroccan companies. He has published a numerous scientific paper and supervised or co-supervised several PhD theses. His main research topics are mechanical design, production, quality, maintenance, logistic and optimization.</p> <p>https://scholar.google.ca/citations?hl=en&pli=1&user=G24_EDIAAAAJ https://www.researchgate.net/profile/Abdellah-El-Barkany</p>
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4.4. Short list reviewers' selection

During the ENHANCE Project Management Board (PMB) meeting (April 8th, 2022), the following list of reviewers was ranked unanimously. The ENHANCE deliverables will be assigned to this list of reviewers according to these selection criteria as summarised in the following table.

Table 5: External reviewers' selection criteria

Selected reviewers	Selection criteria
Prof. Sergio Tersi (IT)	Mastering Industry 4.0 concepts and their applications in industry
Dr. Carlos Coutinho (PT)	Valuable knowledge on industry 4.0 technologies and applications
Prof. Oualid Kamach (MA)	Expert in the impact of digital transformation on supply chain and MES systems
Prof. Nesrine Zoghalmi (TN)	Valuable contributions on AI, and Bigdata to build solutions for the manufacturing domain.

4.5. Repartition of ENHANCE Deliverables per reviewing period

During the ENHANCE project, 35 deliverables are planned.

- 19 for the first reporting period (M1 to M21).
- 16 for the second reporting period (M22 to M36).

The following table summarizes the list of the deliverables, their leader and the delivery month and period (before M21 or M36)

Table 6: ENHANCE deliverables per reporting period

ENHANCE Deliverables						Deliv M21	Deliv M36	
		Type	Milestone	Lead				
WP1	Analysis & Trainers Skills Enhancement			UNL/UCAR				
	D1.1	Literature review about required skills related to MPQ4.0	R	M6	BIBA	PU	1	
	D1.2	Gap analysis between HEIs and industry 4.0 skills related to MPQ4.0	R	M8	UCAR	CO	1	
	D1.3	MPQ4.0 learning framework (LF-MPQ4.0)	R	M12	UNL	PU	1	
	D1.4	Design of training strategy for partner HE staff	R	M8	IIT	PU	1	
	D1.5	Report on Train Tunisian and Moroccan HE staff according to the LF-MPQ4.0	R	M12	UIT	CO	1	
	D1.6	The administrative organisation of the DIH	R	M12	ULL	CO	1	
WP2	Implementation of the learning framework LF-MPQ4.0 and digital innovation hub (DIH)			BIBA/ECC				
	D2.1	Requirements in learning materials for targeted MPQ4.0 skills (WP2)	R	M18	IIT	PU	1	
	D2.2	Pilot 1: Maintenance Engineering	TM, R	M30	ECC	PU		1
	D2.3	Pilot 2: Production Engineering.	TM, R	M30	UCAR	PU		1
	D2.4	Pilot 3: Quality Engineering	TM, R	M30	BIBA	PU		1
	D2.5	The Lifelong eLearning (LeL) platform	TM, R	M24	ULL	CO		1
	D2.6	Reports on the conducted training rounds	R	M30	UNL	CO		1
	D2.7	The 2 Digital Innovation Hubs	TM, R, E, S	M35	IIT	PU		1
WP3	Quality plan for training and skills assessment			ULL/IIT				
	D3.1	Strategic Quality Plan	R	M4, M18	UNL	PU	2	
	D3.2	Sustainability assurance plan	R	M24	BIBA	PU		1
	D3.3	Quality Audit reports	R	M26, M33	ULL	CO		2
	D3.4	Quality expert team training reports	R, E	M12	ECC	CO	1	
WP4	Dissemination and exploitation			UCAR/UIT				
	D4.1	Strategic plan for awareness raising, communication and dissemination	R	M6	ULL	PU	1	
	D4.2	Project identity and guidelines	R	M12	UCAR	PU	1	
	D4.3	Project website	R, S, P	M36	UCAR	PU		1
	D4.5	Meetings report	E, R	Quarterly	UCAR	CO	1	1
	D4.7	Reports on Communication, dissemination and awareness	R	M21,M36	UCAR	PU	1	1
	D4.6	Publications in indexed journals & conferences	R	M18,M35	BIBA	PU	1	1
	D4.4	Project Workshops	R, S	Quarterly	ECC	PU	1	1
WP5	MANAGEMENT			ULL				
	D5.1	Project Management, Quality and Risk Plan	R	M18	ULL	PU	1	
	D5.2	Project periodic reports	R	M18,M36	ULL	CO	1	1
	D5.3	Project final report	R	M36	ULL	CO		1
	D5.4	Project quality and risk management guidelines	R	M18	UNL	PU	1	
Total deliverables						19	16	

Among the list of the ENHANCE deliverables, several basic reporting activities will not be reviewed externally. The related information is basically related to the project management activities or available as public information on the ENHANCE project website. The final list of deliverables to be reviewed externally is highlighted on green in the following table. Therefore, we will assign 14 deliverables for the first reporting period – RP1 (M21) and 11 for the second – RP2 (M36).

Table 7: ENHANCE deliverables assigned for external review per reporting period

ENHANCE Deliverables						Deliv M18	Deliv M36
	Type	Milestone	Lead				
WP1 Analysis & Trainers Skills Enhancement							
UNL/UCAR							
D1.1 Literature review about required skills related to MPQ4.0	R	M6	BIBA	PU		1	
D1.2 Gap analysis between HEIs and industry 4.0 skills related to MPQ4.0	R	M8	UCAR	CO		1	
D1.3 MPQ4.0 learning framework (LF-MPQ4.0)	R	M12	UNL	PU		1	
D1.4 Design of training strategy for partner HE staff	R	M8	IIT	PU		1	
D1.5 Report on Train Tunisian and Moroccan HE staff according to the LF-MPQ4.0	R	M12	UIT	CO		1	
D1.6 The administrative organisation of the DIH	R	M12	ULL	CO		1	
WP2 Implementation of the learning framework LF-MPQ4.0 and digital innovation hub (DIH)							
BIBA/ECC							
D2.1 Requirements in learning materials for targeted MPQ4.0 skills (WP2)	R	M18	IIT	PU		1	
D2.2 Pilot 1: Maintenance Engineering	TM, R	M30	ECC	PU			1
D2.3 Pilot 2: Production Engineering	TM, R	M30	UCAR	PU			1
D2.4 Pilot 3: Quality Engineering	TM, R	M30	BIBA	PU			1
D2.5 The Lifelong eLearning (LeL) platform	TM, R	M24	ULL	CO			1
D2.6 Reports on the conducted training rounds	R	M30	UNL	CO			1
D2.7 The 2 Digital Innovation Hubs	TM, R, E, S	M35	IIT	PU			1
WP3 Quality plan for training and skills assessment							
ULL/IIT							
D3.1 Strategic Quality Plan	R	M4, M18	UNL	PU		2	
D3.2 Sustainability assurance plan	R	M24	BIBA	PU			1
D3.3 Quality Audit reports	R	M26, M33	ULL	CO			2
D3.4 Quality expert team training reports	R, E	M12	ECC	CO		1	
WP4 Dissemination and exploitation							
UCAR/UIT							
D4.1 Strategic plan for awareness raising, communication and dissemination	R	M6	ULL	PU		1	
D4.2 Project identity and guidelines	R	M12	UCAR	PU		1	
D4.3 Project website	R, S, P	M36	UCAR	PU			1
D4.5 Meetings report	E, R	Quarterly	UCAR	CO		1	1
D4.7 Reports on Communication, dissemination and awareness	R	M21, M36	UCAR	PU		1	1
D4.6 Publications in indexed journals & conferences	R	M18, M35	BIBA	PU		1	1
D4.4 Project Workshops	R, S	Quarterly	ECC	PU		1	1
WP5 MANAGEMENT							
ULL							
D5.1 Project Management, Quality and Risk Plan	R	M18	ULL	PU		1	
D5.2 Project periodic reports	R	M18, M36	ULL	CO		1	1
D5.3 Project final report	R	M36	ULL	CO			1
D5.4 Project quality and risk management guidelines	R	M18	UNL	PU		1	
Total deliverables						19	16
Assigned deliverables for external review						14	11

The analysis of the dependencies of between the ENHANCE deliverables in the first reporting period can be summarised in the following figure.

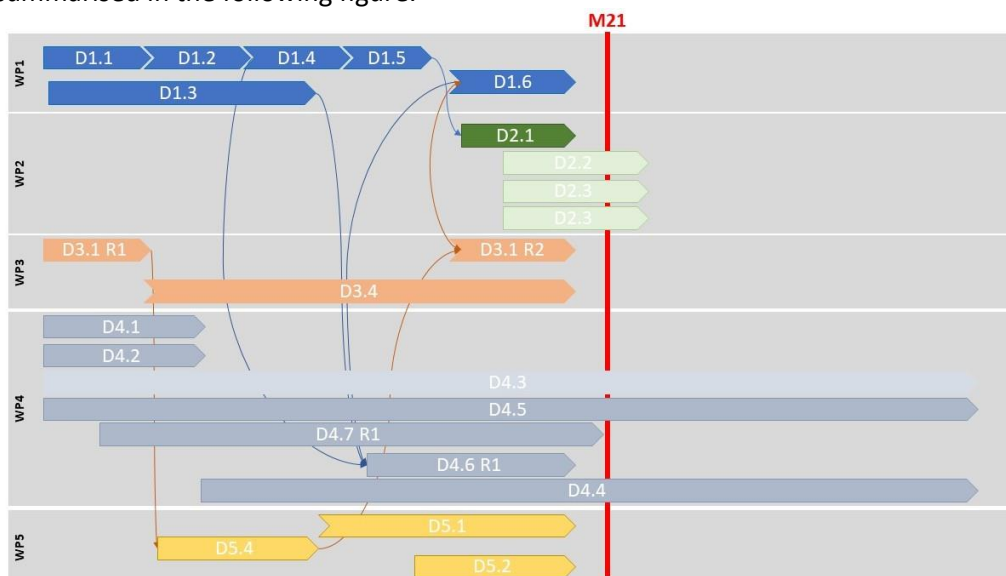


Figure 4: Deliverables dependencies in the first reporting period (M21)

4.6. Budget allocated to the reviewing process

The initial budget allocated to the review of the ENHANCE deliverables was 5000€. As the global ENHANCE budget for the sub-contracting section is 36 500€, more additional 10% (3650€) are added to the review process without any necessary amendment. The final allocated budget for the reviewing process is : 8 650€. Therefore, 346€ is assigned for the review of each deliverable (25 in total) and each deliverable is assigned to only one external reviewer.

4.7. Assignment of ENHANCE deliverables to external reviewers

The four selected external reviewers were invited to review the set of 14 ENHANCE deliverables for the first reporting period. According to their feedbacks and availabilities, the final assignment for this period is summarised in the following table. The proposed reviewing template is the same as the one proposed for internal review. For the second reporting period, the invitations will be sent to the same 4 reviewers starting from the end of M30. According to their availabilities, the external reviewers will be assigned to the 11 deliverables for this second reporting period.

Table 8: ENHANCE deliverables assignment for external reviewers

ENHANCE Deliverables						Deliv M21	External Reviewer	Deliv M36	External Reviewer
	Type	Milestone	Lead						
WP1 Analysis & Trainers Skills Enhancement									
D1.1	Literature review about required skills related to MPQ4.0	R	M6	BIBA	PU	1	Prof. Sergio Terzi (IT)		
D1.2	Gap analysis between HEIs and industry 4.0 skills related to MPQ4.0	R	M8	UCAR	CO	1	Dr. Carlos Coutinho (PT)		
D1.3	MPQ4.0 learning framework (LF-MPQ4.0)	R	M12	UNL	PU	1	M. Oualid Kamach (MA)		
D1.4	Design of training strategy for partner HE staff	R	M8	IIT	PU	1	Dr. Carlos Coutinho (PT)		
D1.5	Report on Train Tunisian and Moroccan HE staff according to the LF-MPQ4.0	R	M12	UIT	CO	1	Dr. Carlos Coutinho (PT)		
D1.6	The administrative organisation of the DIH	R	M12	ULL	CO	1	Dr. Carlos Coutinho (PT)		
WP2 Implementation of the learning framework LF-MPQ4.0 and digital innovation hub (DIH)									
D2.1	Requirements in learning materials for targeted MPQ4.0 skills (WP2)	R	M18	IIT	PU	1	M. Oualid Kamach (MA)		
D2.2	Pilot 1: Maintenance Engineering	TM, R	M30	ECC	PU			1	
D2.3	Pilot 2: Production Engineering	TM, R	M30	UCAR	PU			1	
D2.4	Pilot 3: Quality Engineering	TM, R	M30	BIBA	PU			1	
D2.5	The Lifelong eLearning (LeL) platform	TM, R	M24	ULL	CO			1	
D2.6	Reports on the conducted training rounds	R	M30	UNL	CO			1	
D2.7	The 2 Digital Innovation Hubs	TM, R, E, S	M35	IIT	PU			1	
WP3 Quality plan for training and skills assessment									
D3.1	Strategic Quality Plan	R	M4, M18	UNL	PU	2	Dr. Carlos Coutinho (PT)		
D3.2	Sustainability assurance plan	R	M24	BIBA	PU			1	
D3.3	Quality Audit reports	R	M26, M33	ULL	CO			2	
D3.4	Quality expert team training reports	R, E	M12	ECC	CO	1	M. Oualid Kamach (MA)		
WP4 Dissemination and exploitation									
D4.1	Strategic plan for awareness raising, communication and dissemination	R	M6	ULL	PU	1	Dr. Nesrine Zoghliami (TN)		
D4.2	Project identity and guidelines	R	M12	UCAR	PU	1	Dr. Nesrine Zoghliami (TN)		
D4.3	Project website	R, S, P	M36	UCAR	PU			1	
D4.5	Meetings report	E, R	Quarterly	UCAR	CO	1		1	
D4.7	Reports on Communication, dissemination and awareness	R	M21, M36	UCAR	PU	1		1	
D4.6	Publications in indexed journals & conferences	R	M18, M35	BIBA	PU	1		1	
D4.4	Project Workshops	R, S	Quarterly	ECC	PU	1		1	
WP5 MANAGEMENT									
D5.1	Project Management, Quality and Risk Plan	R	M18	ULL	PU	1	Dr. Nesrine Zoghliami (TN)		
D5.2	Project periodic reports	R	M18, M36	ULL	CO	1		1	
D5.3	Project final report	R	M36	ULL	CO			1	
D5.4	Project quality and risk management guidelines	R	M18	UNL	PU	1	Dr. Nesrine Zoghliami (TN)		
Total deliverables						19		16	
Assigned deliverables for external review						14		11	

4.8. Scheduling of the reviewing process

For the first reporting period (till month 21), there are 19 deliverables reviewed internally, as soon as they are released, by two reviewers and improved according to their comments. Only 14 are proposed for external review. The schedule for the external reviewing process is summarised in the following figure.

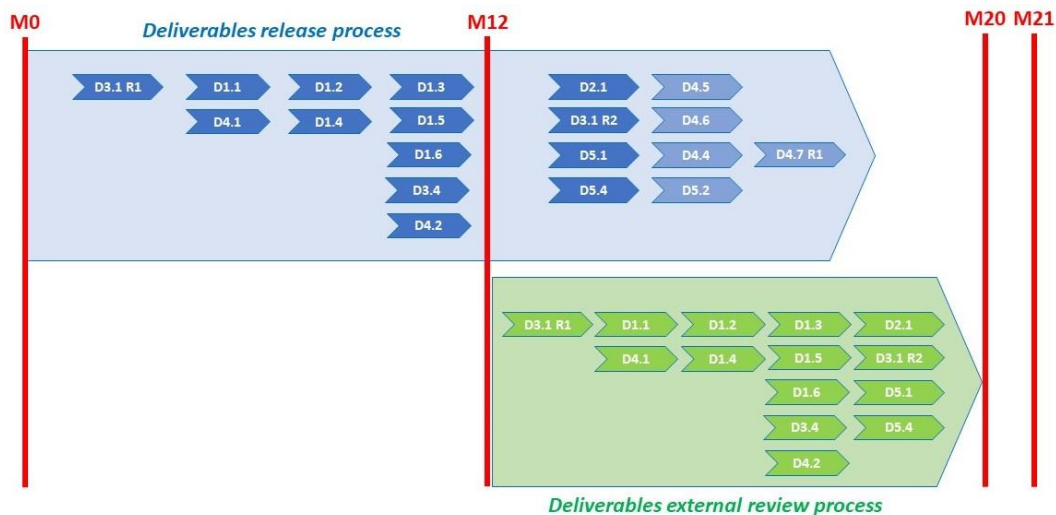


Figure 5: External review process for the first reporting period

For the second reporting period (between months 19 and 36), there are 16 deliverables to be reviewed internally, as soon as they will be released, by two reviewers and to be improved according to their comments. Only 11 are proposed for external review. The schedule for the external reviewing process is summarised in the following figure.

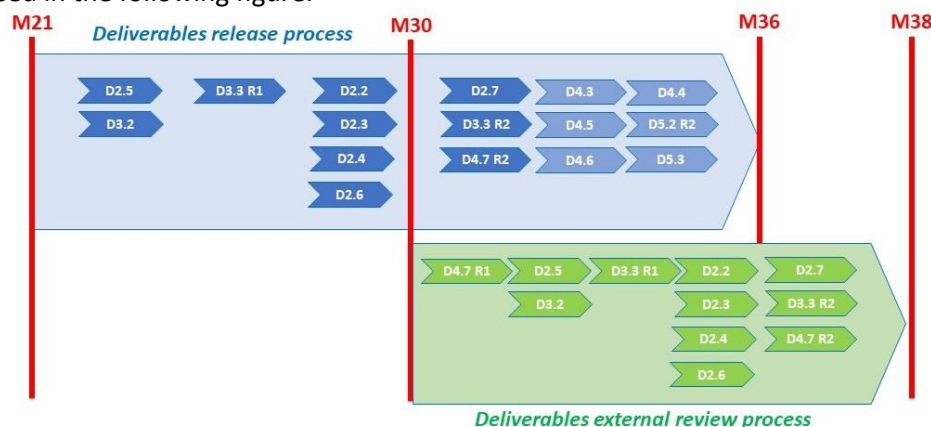


Figure 6: External review process for the second reporting period

5. Risks list update at M18

The initial list of risks as described on the ENHANCE project proposal and reported on D5.4 is update on Month 18 of the ENHANCE project lifetime. This update revises the list of risks, their quotations and the proposed actions to mitigate them. The following table reports this new list.

Table 9: Risks updates at M18

Management risks			
Risk	WP Likelihood/ Severity	Proposed risk-mitigation measures	Current Status in M18
Affection of a further expansion of the COVID-19 crisis (or others) on the progress of the project	WP5 Medium/ Medium	Monitoring reinforcement by increasing the contact by telephone and WEBEX web conferencing. Replacing physical meetings (due to travel restrictions) by telephone, video	This pandemic situation is now under control. All physical meetings are planned

		and web conferencing. Putting in place smart working protocols.	
Insufficient consortium coordination	WP5 Low/Low	The effective management of the consortium will be assured with the appropriate Project Management described in WP5. The roles & responsibilities of each partner are already identified and will be continuously reviewed to mitigate the risk of overlapping and implementation of the same activities from two or more partners. The project is led by ULL, partner that have large experience in project coordination	PBM meetings are organized when necessary to present the plan of the project activities and help partners needing support for administrative issues
Shortage of resources and/or change of personnel	WP5 Low/Low	All ENHANCE partners have assured that they will choose their best personnel to implement the relevant activities. All partners could change a member of their team with another person with comparable competencies, in case of inability to continue. They will early communicate personnel problems and knowledge gaps. ULL will keep close contact with all partners and will regularly monitor resource consumption and compare it against the remaining work to identify bottlenecks.	Partners efforts declarations are done in parallel with tasks/deliverables development. Involved resources are continuously checked with each partner.
Technical risks			
Risk	WP Likelihood/Severity	Proposed risk-mitigation measures	Current Status in M18
Misunderstanding in key terms/concepts	WP1, WP2, WP3, WP4 Low/Low	the partners will start with defining all the terms (e.g., competence, skill, learning materials, platform, ...) and concepts within D1.1 and D1.2 to avoid misunderstanding during the development phases. These terms/concepts will be adopted by all project members	By achieving WP1 deliverables, the consortium reaches a good understanding of the main MPQ 4.0 concepts
Deadlines are not respected	WP1, WP2 Medium/Medium	the risk assessment plan (T5.2/D.5.1) will suggest special measures to accelerate some activities. The project is led by ULL, partner that have large experience in project coordination	Tasks leaders, WPs leaders, and the coordinator are chasing the partners to deliver on time. The consortium shares a good understating of the deliverables' dependencies
Difficulties to collect data/knowledge from companies	WP1, WP2 Medium/Low	ENHANCE partner, mainly from PC countries, have assured the possibility of gathering the data/knowledge from HEI and industrial partners in Tunisia and Morocco. Many associated partners from both countries are indirectly involved within the ENHANCE project	To collect industrial requirements, one online industrial workshop and 3 industrial visits were organized (1 in TN and 2 in MA) in the first period.

Insufficient consortium competence / effectiveness / skills	WP1, WP2, WP3, WP4 Low/Low	The project team is highly complementary and gathers together the requested skills for the main streams. All the technologies that are going to be used in the implementation of the project outcomes will be carefully selected to minimize potential risks. If a consortium incompetence is identified, the consortium partners will try to fill this gap through the own pools of resources.	The main outcomes of the project were published in 2 IEEE conferences. Additional papers are submitted for publication
Legal and administrative issues related to the implementation of the Pilots and the LeL platform	WP2 Medium/Medium	the project team will organize a meeting with the Tunisian and Moroccan ministries of higher education and with the Tunisian and Moroccan ministries of industry and Companies to solve legal and administrative issues	NA
Legal and administrative issues related to the implementation of the creation of DIH	WP2 Medium/Medium	the project team will organize a meeting with the Tunisian and Moroccan ministries of higher education and with the Tunisian and Moroccan ministries of industry and Companies to solve legal and administrative issues	D1.6 is released with a clear process to create DIH in TN and MA. The partners are in the process to create their Competence Centres as a first step
Problems with the selection of trainers	WP1, WP2, WP3 Low/Low	a set of rules will be defined to select trainers. A waiting list of candidates trainers will be prepared in case of candidate's withdrawal	NA
Travel problems due to unexpected events that can prevent necessary meetings for the preparation and development of LeL platform and creation of DIHs	WP1, WP2, WP3, WP4 Medium/Low	Web-conferences with project members will be organized. Partners will collaborate remotely and use specific software tools for work sharing and an efficient interaction.	Several online meetings were organized to minimize the impact of the covid pandemic.
Technical problems related to hosting the mooc or the LeL	WP1, WP2 Low/Low	IT department of each ENHANCE partner will support the project teams to solve such problems	Nothing to mention
Communication & Dissemination risks			
Risk	WP Likelihood/Severity	Proposed risk-mitigation measures	Current Status in M18
Problems or delays in updating websites and/or ENHANCE pages in social networks	WP4 Low/Low	Apply the dissemination and communication plan developed during the project for a continuously provision of necessary dissemination and communication materials	The ENHANCE website and social media are updated with the project activities
Poor or inadequate co-operation or	WP1, WP2, WP3, WP4, WP5	Keep close contact with all partners by bi-weekly telcos and virtual meetings. Organize regular plenary	Bi-weekly regular meeting (3h) is organized to coordinate the evolution of

communication between the ENHANCE partners	Medium /Low	and technical meetings at different partners' sites. Detailed project plan that clearly states goals and responsibilities of the partners.	ENHANCE activities
Expected reports do not provide the necessary information	WP1, WP2, WP3, WP4, WP5 Medium/Medium	the project executive board will review all reports, particularly audit reports and request the addition of missing information. The quality plan of ENHANCE getting importance to this issue	The outline of each deliverable is presented and discussed for validation. After its release, each deliverable is reviewed internally by two partners.
Travel problems due to unexpected events that can prevent the organization of some workshops and conferences	WP1, WP2, WP3, WP4, WP5 Medium/Medium	All ENHANCE partners have the ability to organize web-conferences to overcome travel problems.	Several online regular and plenary meetings were organized to conduct the ENHANCE activities
Some unpredictable events may disturb the normal execution of the project activities.	WP1, WP2, WP3, WP4, WP5 Medium/Medium	In that case, the executive board will suggest appropriate decisions	Nothing to mention
The communication and dissemination will depend on the progress of the project activities	WP1, WP2, WP3, WP4, WP5 Medium/Medium	Since any delay will impact the planned dissemination events, the dissemination plan will be	3 industrial workshops and 4 dissemination events were organized during the first reporting period
Sustainability risks			
Risk	WP Likelihood/Severity	Proposed risk-mitigation measures	Current Status in M18
Lack of continuously enhancement of the content of the platform (training materials including course materials, video, tutorials, case studies, etc.)	WP2 Medium/Medium	Apply the quality plan developed during the project for the continuously enhancement of platform	The proposed training materials in T2.2/T2.3/T2.4 were presented and discussed during the regular meetings. After their presentation during the train the trainer sessions, feedbacks are collected to improve the proposed contents
The expected viability of the ENHANCE project is not achieved	WP1, WP2, WP3, WP4, WP5 Low/Low	New partnerships with local HEIS and industry will be created for raising awareness, project outcomes will be made available for other Tunisian and Moroccan HEI, Maghrebien (Mauritania and Algeria) and African countries, paid training workshops for students and companies' staff will be offered. ENHANCE partner have the intention to proceed with the development of new competencies, skills and projects related to other fields such as health 4.0 or Farming 4.0. ENHANCE partners intend to submit new projects (e.g., Erasmus+,	Through the organized industrial workshops for communication and dissemination, academic institutions and industrial representatives are always invited to discover ENHANCE activities and outcomes

		Horizon Europe) in topics addressing challenges related to the industry of the future and to develop new partnership with local industry to solve real problems requiring MPQ4.0 skills	
Some PC HEIs are not motivated for an evolution of their curriculum	WP1, WP2, WP3, WP4 Low/Low	Project outcomes will be first implemented in project partner HEI. Then a dissemination workshop will be organized to present project results to motivate other HEI.	The 8 existing programmes are deeply analysed (in D1.2) to identify the connection between the existing courses and the proposed training activities in ENHANCE. The impact in terms of adaptation for the existing courses were analysed and defined in hours

6. Annexes

6.1. Annexe 1: Train the Trainers' session evaluation template



Activity Evaluation Form

Name of the activity : _____

Date of the training : _____

Partner name : _____

Directions: On a scale of 1-5 (5 being the highest, best or most and 1 being the least, lowest or worst) rate by circling the number reflecting your opinion.

To what extent the scope of the activity was clear?

1 2 3 4 5

Comment: _____

To what extent did the activity can contribute to improve existing courses in your institution?

1 2 3 4 5

Comment: _____

To what extent were the objectives stated at the beginning of the activity satisfied?

1 2 3 4 5

Comment: _____

To what extent did the activity contain significant current intellectual or practical content related to MQP4.0/Industry 4.0?

1 2 3 4 5

Comment: _____

What are the courses that may be impacted by this activity?

Name of courses	: _____
	: _____
	: _____

Exploitation: On a scale of 1-5 (5 being the highest, best or most and 1 being the least, lowest or worst) rate by circling the number reflecting your opinion.

To what extent the activity content is ready to be reused?

1 2 3 4 5

Comment: _____



To what extent additional adaptation efforts are needed to reuse the proposed activity contents?

1 2 3 4 5

Comment: _____

To what extent do you need support to adapt or adopt the proposed contents?

1 2 3 4 5

Comment: _____

Sustainability: On a scale of 1-5 (5 being the highest, best or most and 1 being the least, lowest or worst) rate by circling the number reflecting your opinion.

To what extent you consider the activity content is useful for other trainers training for the next three years?

1 2 3 4 5

Comment: _____

To what extent you consider the activity content is useful for students training for the next three years?

1 2 3 4 5

Comment: _____

To what extent you consider the activity content is useful for industrial workers training for the next three years?

1 2 3 4 5

Comment: _____

Any comments and recommendation to trainers
