

Enhance

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Executive Summary

The purpose of this document is to present the outcomes of first industrial workshop organized online on July 7th, 2021. The first objective of this workshop is to collect data from Moroccan and Tunisian industry and universities in order to identify gap between targeted MPQ4.0 skills, existing curricula being offered in both Tunisian and Moroccan partner universities programs and also local industrial need. As a CBHE project, the ENHANCE vision is organised around five main pillars:

- The European vision about Maintenance, Production, and Quality engineering in the context of industry 4.0 (MPQ4.0). The programme country members synthesise the most impacting related work in MPQ 4.0, share the best practices of the teaching programmes in their institutions and finally, their Digital Innovation Hubs (DIHs) services and experimented solutions.
- The partner countries vision about the existing teaching programmes in the involved Tunisian and Moroccan universities. This vision is completed with current practices and new MPQ 4.0 requirements collected from selected industrial partners in different application domains.
- The MPQ 4.0 Learning Framework to cover the gaps and draw the path for training the trainers in the three main topics.
- The MPQ 4.0 pilots development to create effective skills, competencies, technology acquisition channels to support digital transformation in the industry. The generated materials are to be structured in the Longlife eLearning (LeL) platform to be deployed at each partner countryside.
- The creation of 2 DIHs, one in Tunisia and one in Morocco to sustain the ENHANCE outcomes and organise their exploitation model to support MPQ 4.0 industrial challenges in both countries.

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1. ENHANCE project Overview

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.

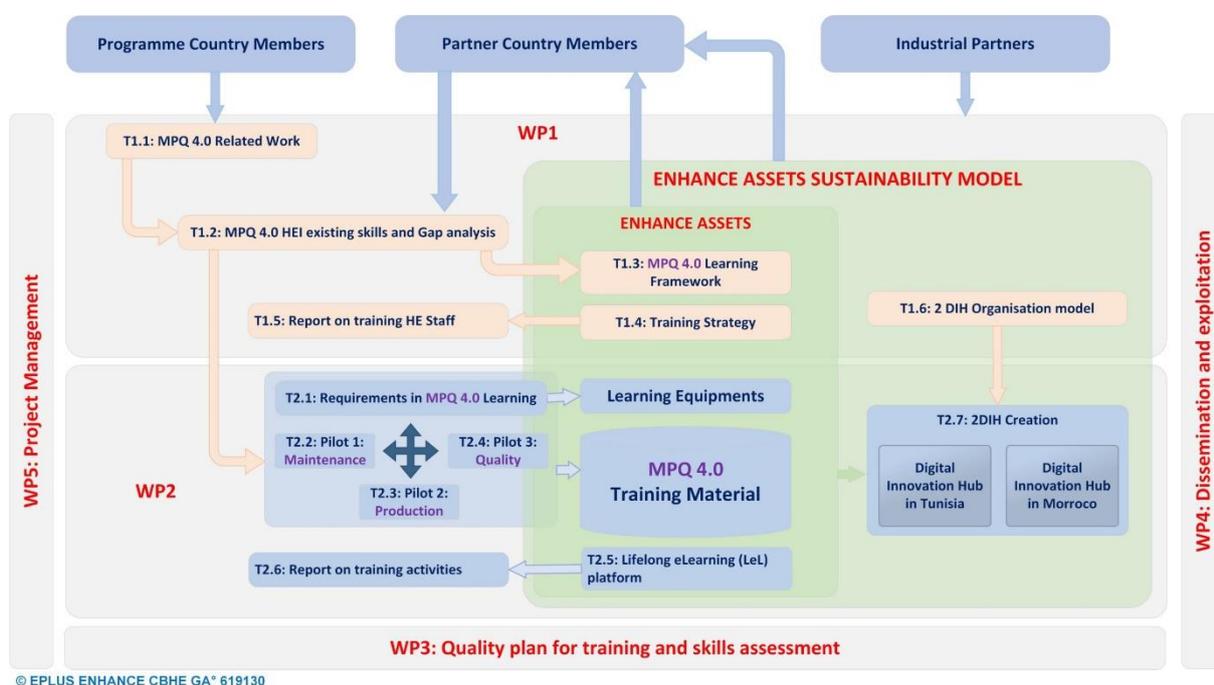


Figure 1. ENHANCE project organization.

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.

2. Introduction

In recent years, the industry in North Africa (also called Maghreb) region, especially Morocco and Tunisia, is facing a historical turning point when considered on a global scale. The digital age comprises a new way of thinking regarding manufacturing and operations. To improve the attractiveness for investment and to meet market requirements of competitiveness, in terms of performance, quality, and sustainability, both Morocco and Tunisia need to support industrialization. In this context, this project focus on industry 4.0 and particularly on the three following topics: Production 4.0, Maintenance 4.0 and Quality 4.0, which represent key industrial business processes that particularly need attention, investment and improvement. Through this project, several Tunisian and Moroccan universities and companies showed their interest to develop skills and knowledge to take full advantage of industry 4.0 paradigm and technologies related with these three core business processes of Industry 4.0.

2.1. Purpose of the document

The objective of this document is to present the different organized dissemination events. Some statistics are presented.

2.2. Structure of the document

The structure of the document is :

- Chapter 3: List of dissemination events
- Chapter 4: Erasmus Morocco Cluster meeting
- Chapter 5: Seminar for presentation of the new master industry 4.0 of IIT
- Chapter 6: Transferable research and Laboratory outcome
- Chapter 7: Seminar “Industrie 4.0, une réalité qui s’impose”

3. List of dissemination events

During the first period of the project, four dissemination events were organized:

- Erasmus Morocco Cluster meeting of the new CBHE projects selected in 2020, October 11th, 2021 (online)
- Seminar for presentation of the new master industry 4.0 : October 2021 (IIT, Sfax)
- Transferable research and Laboratory outcome: April 27-29 2022 (Portugal).
- Seminar "Industrie 4.0, une réalité qui s'impose » May 25, 2022 (IIT, Sfax).

All these events are detailed in next sections.

4. Erasmus Morocco Cluster meeting

During the first year of the project, the Moroccan ERASMUS+ Office organized an online cluster meeting for all ERASMUS+ project involving Moroccan partners. The event was organized on October 11th, 2021. During this event, 7 ERASMUS+ projects were presents: Wemag, Mathics, Icfal, Fosamed, Enhance et AgriEngage.



Figure 2 – Moroccan Erasmus+ cluster meeting

For ENHANCE, Moroccan representatives, Pr. Abdelmajid Elouadi from University Ibn Tofail and Pr. Saber Darmoul from Ecole Centrale Casablanca presented project, its consortium, objectives and its organizations.



Figure 3 – Online meeting of Moroccan Erasmus+ cluster meeting

5. Seminar for presentation of the new master industry 4.0 of IIT

The project partner IIT developed a new master titled “industry 4.0”. IIT organized a seminar to present their new master on October 13th, 2021. During the seminar, Dr. Sabeur Elkosantini from University of Carthage (Tunisia) presented the project and Dr. Lounes Bentaha from University Lumière Lyon 2 (France) presented the activity “predictive maintenance” which is developed in Task 2.2 (WP2).



Figure 4 – flyer and program of seminar of the presentation of the new master industry 4.0 of IIT

6. Transferable research and Laboratory outcome

This workshop was organized by UNL and held in Lisboa (Portugal) from April 28th to April 29th 2022. During this event, representatives from around 20 EU projects (such as ZDMP - Zero Defect Manufacturing Platform, INEDIT Project, DigiPrime, SHYFTE project, ENHANCE, QualiChain, edenhub, LAB-MOVIE Project, Vessel AI, DIGITAQ PROJET, yachay, Smart4Health, H2020-Faith, i4Q Project, EFPF Project).



Figure 5 – flyer of the Transferable research and Laboratory outcome

The main objective of this event to present some of their outcomes. With regards to ENHANCE, the following talks were held:

- Presentation of the project, by Pr. Nejib Moalla (ULL)
- Presentation of the conducted gap analysis (T1.2/D1.2), by Dr. Sabeur Elkosantini (UCAR)
- Presentation of the learning framework (T1.3/D1.3), by Dr. Joao Saraipa (UNL)
- DIH Sustainability (T1.6/T1.6), by Pr. Nejib Moalla (ULL)

This event was a good opportunity to share experiences and results of many EU funded projects addressing different scientific and technological challenges and problems.

7. Seminar “Industrie 4.0, une réalité qui s’impose”

This seminar was organized by IIT on May 25th, 2022 in Sfax (Tunisia). In this workshop, 60 industrial representatives, 46 teachers, 397 Students and 12 other participants were present. During this workshop, the following talks were given:

- Dr. Achraf Ammar (IIT): Introduction to the ENHANCE project objectives,
- Dr. Mohand Lounes Ben Taha (ULL): predictive maintenance, an application of industry 4.0. During this presentation, Dr. Ben taha presented the use case developed in T2.4 adressing the predictive maintenance.
- Pr. Nejib Moalla (ULL): Quality Models design in industry 4.0. In this talk, Pr. Nejib Moalla presented the activity “Act 5.3 QC model design” (part of the task T2.4).

- **Sabeur Elkosantini (UCAR):** Towards academic training at the service of companies in Tunisia and Morocco. In this presentation, Dr. Sabeur Elkosantini presented the gap analysis, a task that was conducted during the task T1.2, and the suggested training activities and use cases identified based on the gaps.



Figure 6 – flyer and program of Seminar “Industrie 4.0, une réalité qui s'impose “