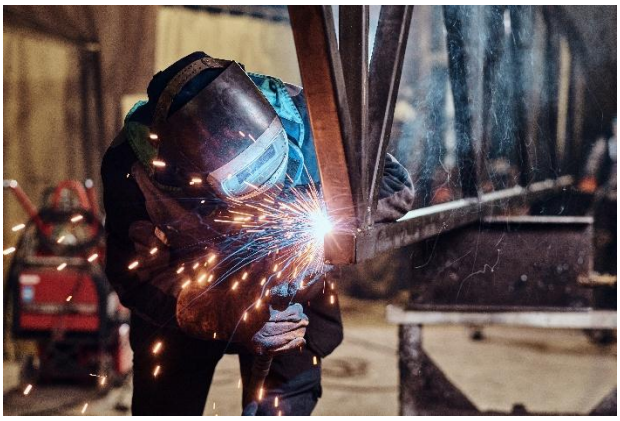
Call for Bachelor Thesis

State of the Art of Predictive Maintenance Skilled Worker Development in Learning Factories across Europe

Motivation and Problem Statement: Circular Economy is becoming more mainstreamed in European automotive manufacturing. Industries are striving to adhere to the latest cutting-edge practices in circular material welding (CMW) with embedded predictive maintenance systems (PMS) that would rapidly reduce corrosion, infrastructure and critical parts failures (breakage) and ultimately reduce/avoid severe injuries to employees and end-customers (society). The skill shortage in the EU in this field is currently exceeding half a million laborers which, in the current stage, EU Vet centers are unable to produce neither via initial training (IVET) or continuous training (CVET).

WELDNET aims to establish 5 regional centers of vocational excellence (COVEs) across Europe to provide long-term sustainable upskilling mechanisms (IVET/CVET) for workers/learners (including those with disabilities or from social groups at risk such as minorities/refugees). The COVEs will serve current & emerging regional industrial needs (according to the smart specialization strategy of each region).

The aim of this thesis is to investigate how learning factories across Europe support the development of predictive maintenance skills for workers and learners in manufacturing. The literature review will examine how learning factories can contribute towards upskilling and reskilling in maintenance in the context of digital, green, and human-centered transformation of industry by identifying effective approaches, current initiatives, and remaining gaps in vocational education and training.



Guiding Research Question:

How do learning factories in Europe contribute towards the development of predictive maintenance skills in initial and continuous vocational education training and what practices can be considered most effective in tackling the current skill gap in the manufacturing industry?

Expected Outcome:

- Conduct a literature review to determine, classify, and categorize the state of the art of Predictive Maintenance skilled worker development in learning factories across Europe.
- Consider the key skills necessary in modern manufacturing environments and triple transformation (industry 5.0), how learning factories can support upskilling and reskilling, best practices and current initiatives across Europe.
- Highlight the main challenges and gaps in vocational education systems regarding predictive maintenance education.

Methodology:

- Literature review on the state of the art of Predictive Maintenance skilled worker development in learning factories across Europe
- Systematic review of the best practices and current initiatives across Europe

Expected Competence of a Candidate:

- Good understanding of manufacturing and maintenance
- Good knowledge of research methodology.

Target Study Programs:

- Business Informatics
- Mechanical-Industrial Engineering

This work offers an excellent opportunity for students interested in the intersection of sustainability, skill development in the manufacturing industry and industrial maintenance. If you are interested, please reach out with your CV, transcripts and a short motivation letter outlining your interest and relevant experience.

We look forward to your applications!

Advisor

Univ.-Prof. Dr.-Ing. Fazel Ansari

Email: fazel.ansari@tuwien.ac.at

Contacts

Brenda Özyilmaz, B.Sc.

Email: brenda.eozyilmaz@tuwien.ac.at

Milena Mann

Email: milena.mann@tuwien.ac.at