TRANSFORMATION OF THE MTA ECOSYSTEM

DR. JAKUB STOLFA, ASA PRESIDENT & VSB-TUO
JS@SKILLS-ALLIANCE.EU

27th September 2024, Industry 5.0 Webinar: Upskilling and Reskilling for a competitive future in the MTA, Aerospace & Defence, Electronics

AUTOMOTIVE SKILLS ALLIANCE

AUTOMOTIVE SKILLS ALLIANCE

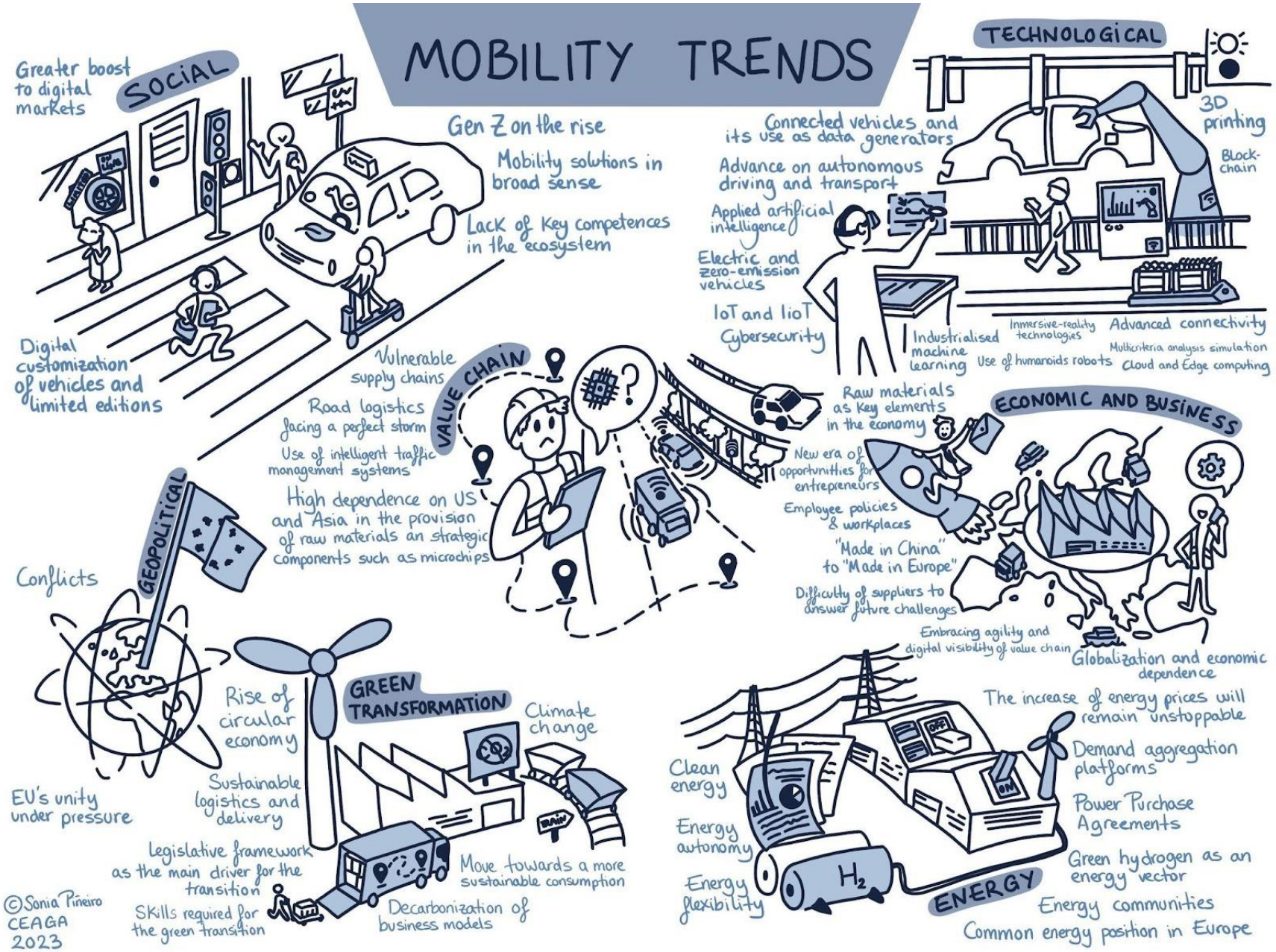
AUTOMOTIVE-MOBILITY ECOSYSTEM IN TRANSITION

Continuous transition?

EU Automotive Sector

- Employs almost **13 million Europeans in direct and indirect jobs**; **6.8% of total EU employment**
- **10.5% of EU manufacturing jobs** are directly and indirectly in Automotive
- **Turnover** represents over **7% of EU GDP**
- **31% of all EU R&D** spending is in **Automotive**
- Link to other sectors – **multiplier effect** – steel, chemicals, textiles, batteries, ICT, chips, repair, and mobility services

Source: ACEA, EUROSTAT & EC


MOBILITY TRENDS
SOCIAL
Greater boost to digital markets
Gen Z on the rise
Mobility solutions in broad sense
Lack of key competences in the ecosystem
Digital customization of vehicles and limited editions
TECHNOLOGICAL
Connected vehicles and its use as data generators
3D printing
Block-chain
Advance on autonomous driving and transport
Applied artificial intelligence
Electric and zero-emission vehicles
IoT and IIoT
Cybersecurity
Industrialised machine learning
Immersive-reality technologies
Advanced connectivity
Multicriteria analysis simulation
Use of humanoids robots
Cloud and Edge computing
VALUE CHAIN
Vulnerable supply chains
Road logistics facing a perfect storm
Use of intelligent traffic management systems
High dependence on US and Asia in the provision of raw materials an strategic components such as microchips
Raw materials as key elements in the economy
ECONOMIC AND BUSINESS
New era of opportunities for entrepreneurs
Employee policies & workplaces
"Made in China" to "Made in Europe"
Difficulty of suppliers to answer future challenges
Embracing agility and digital visibility of value chain
Globalization and economic dependence
GEOPOLITICAL
Conflicts
EU's unity under pressure
GREEN TRANSFORMATION
Rise of circular economy
Climate change
Sustainable logistics and delivery
Legislative framework as the main driver for the transition
Skills required for the green transition
Move towards a more sustainable consumption
Decarbonization of business models
ENERGY
The increase of energy prices will remain unstoppable
Clean energy
Demand aggregation platforms
Energy autonomy
Power Purchase Agreements
Energy flexibility
Green hydrogen as an energy vector
Energy communities
Common energy position in Europe
©Sonia Pineiro CEAGA 2023

Source:


Fast changes in the technologies
Need of fast adaptation of the curricula and training materials – initial education & continuous education
Effectiveness & quality of the education and training offer
New and prefered ways of training delivery
Recognition of education and skill levels achieved
(R)Evolution of the education and training as such?
©Sonia Pineiro CEAGA 2023
the green transition
business models
Common energy position in Europe
RESIST

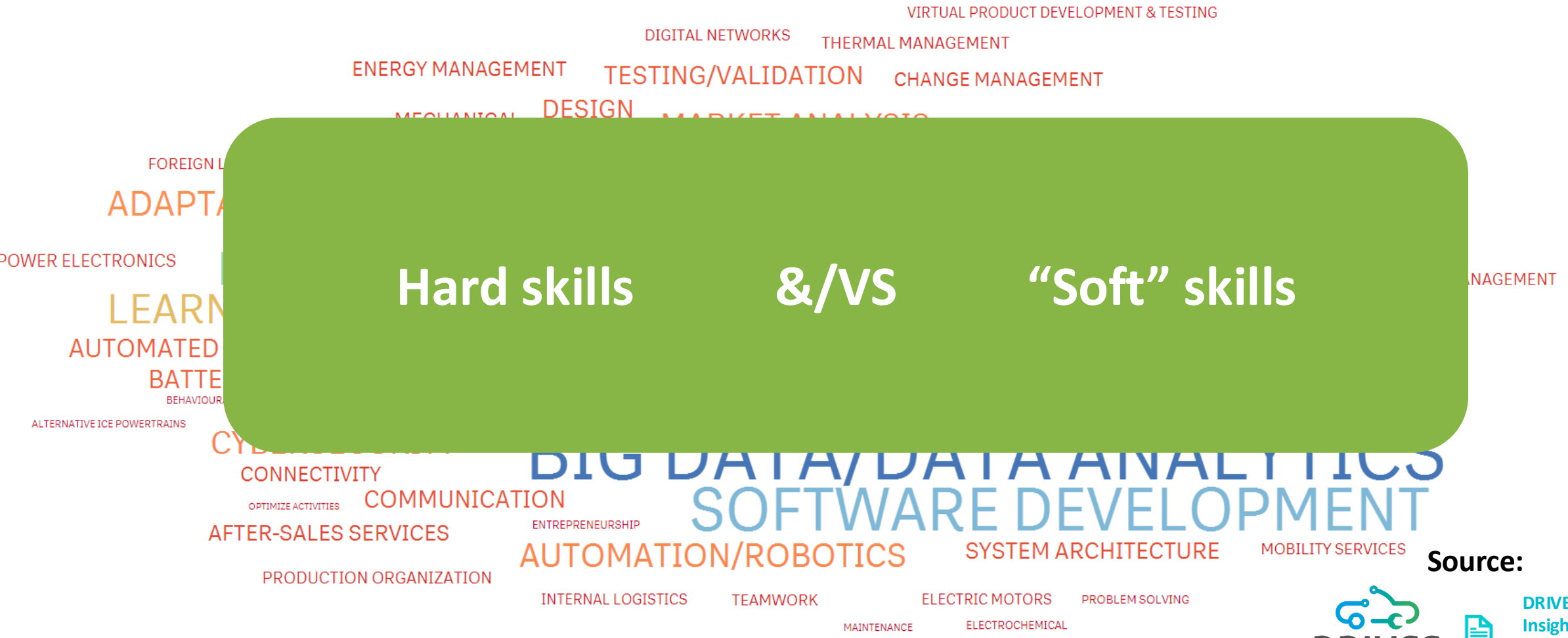
What skills we need? Look back to 2019?

Source:

DRIVES
Development and Research on Innovative Vocational Education Skills

DRIVES-D2.7 Insights to Automotive Sector

What skills we need? Look back to 2019?

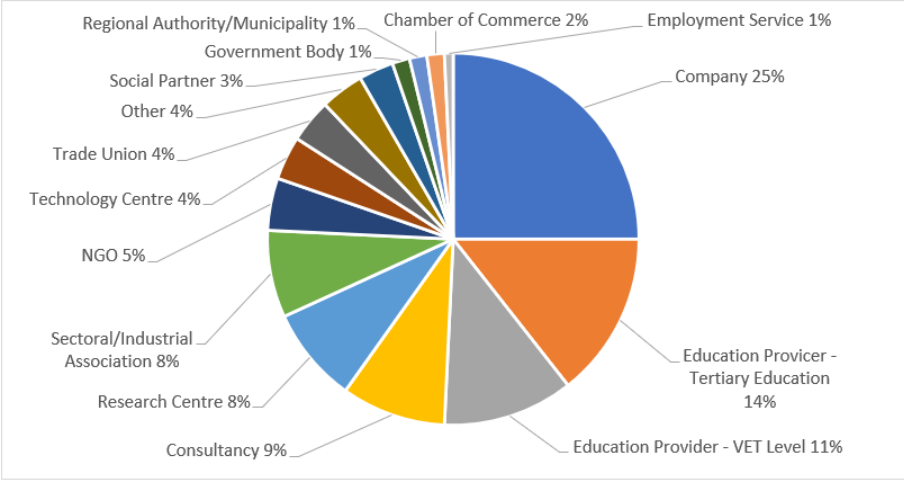


Source:

DRIVES
Development and Research on Innovative Vocational Education Skills

DRIVES-D2.7 Insights to Automotive Sector

What skills we need - Digitalisation? Survey September 2024



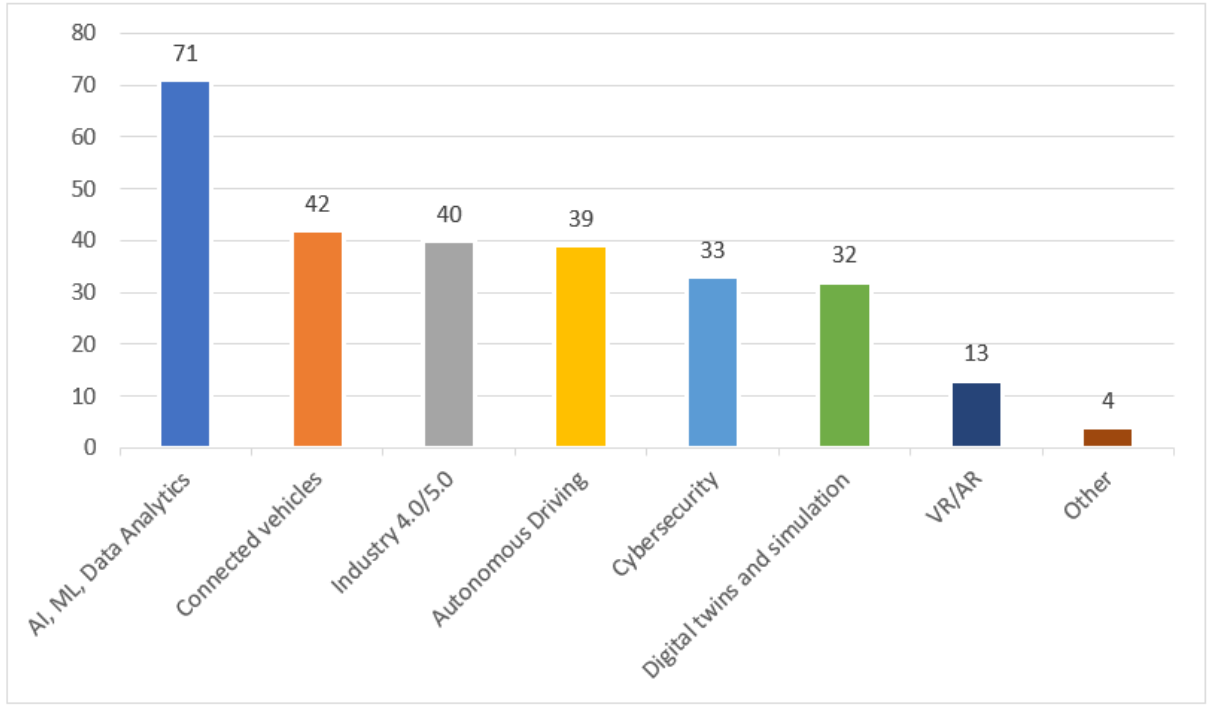


Figure 10 Relevance of digitalisation trends in the near future

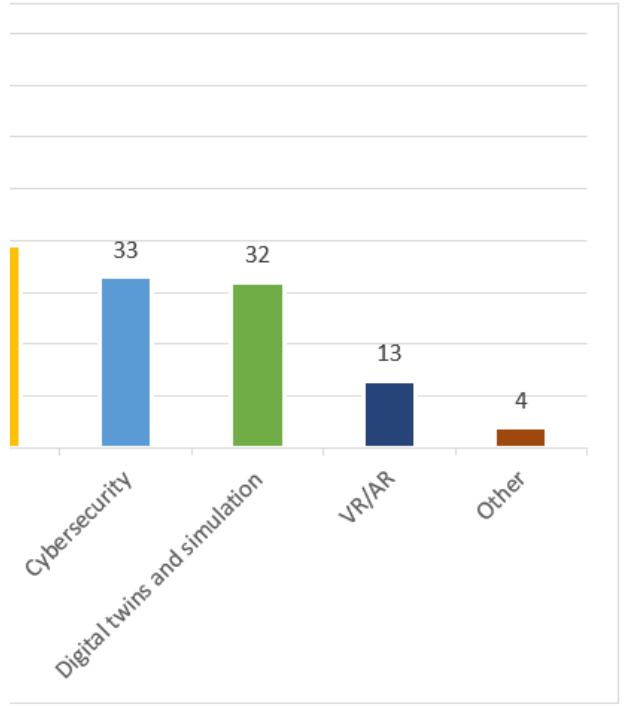
Source:

TRIREME
DIGITAL & GREEN SKILLS TOWARDS FUTURE OF THE MOBILITY ECOSYSTEM

What skills we need - Digitalisation? Survey September 2024

Regional
Socia
Oth
Trade Union
Technology Cen
NGO 5%
Sectoral/Indu
Associatior
Resear

Figure 13 Word cloud: Digitalisation trends' impact on job roles and skills in the near future

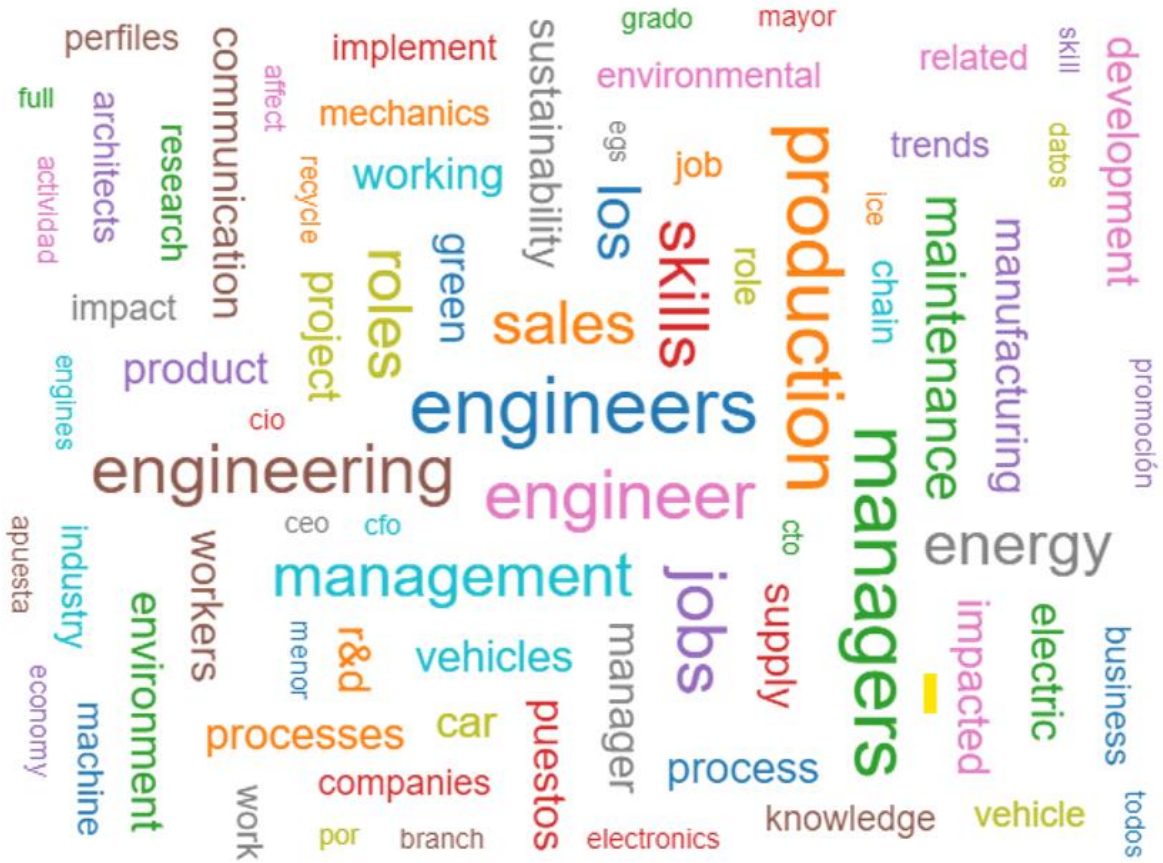


alisation trends in the near future

Source:

TRIREME
DIGITAL & GREEN SKILLS TOWARDS FUTURE OF THE MOBILITY ECOSYSTEM

What skills we need - GREEN, SUSTAINABILITY AND CIRCULAR ECONOMY? Survey September 2024



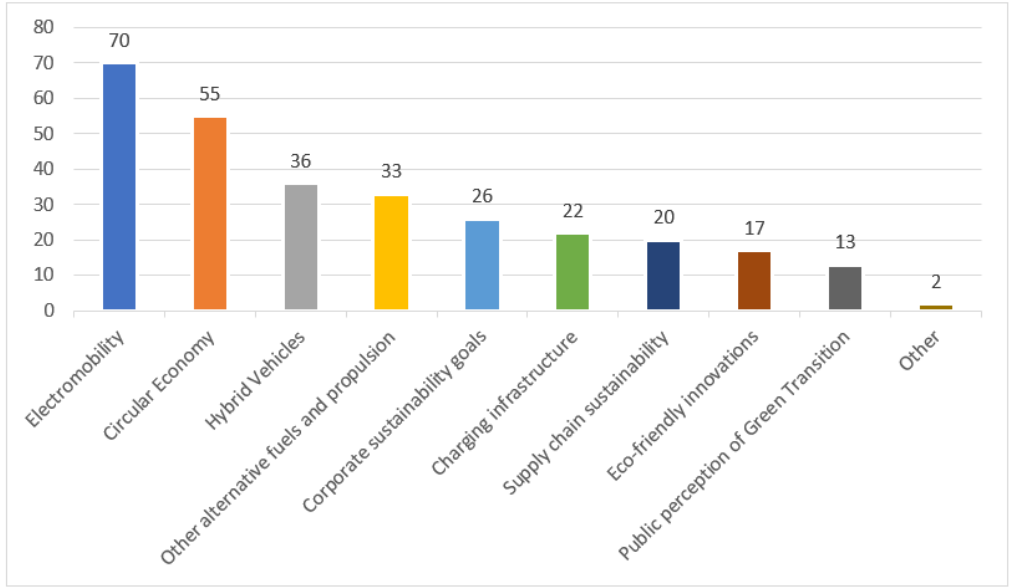


Figure 15 Relevance of green and sustainability trends in the near future

Source:

TRIREME
DIGITAL & GREEN SKILLS TOWARDS FUTURE OF THE MOBILITY ECOSYSTEM

What skills we need - GREEN, SUSTAINABILITY AND CIRCULAR ECONOMY? Survey September 2024

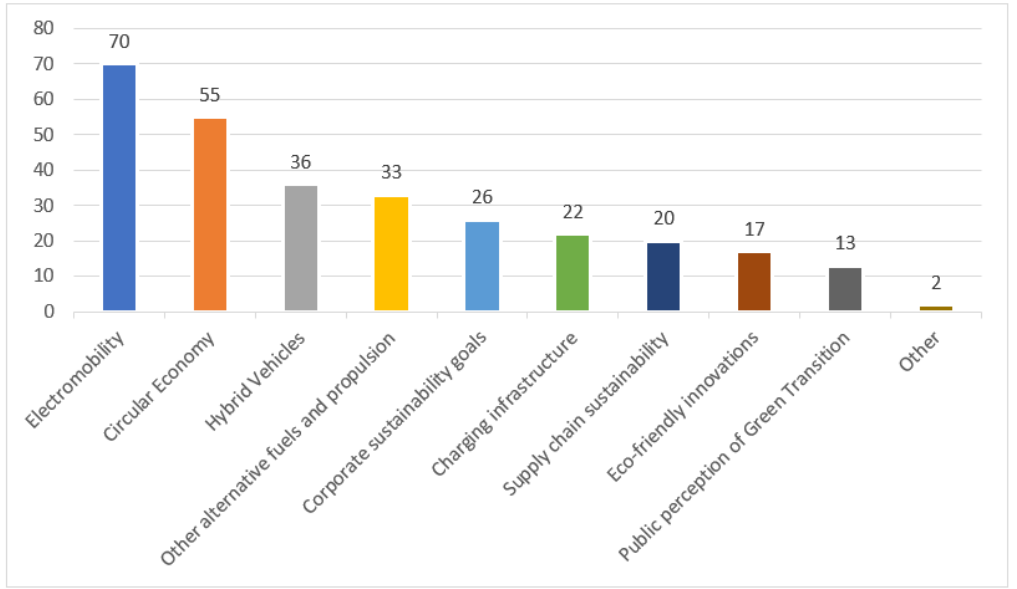


Figure 15 Relevance of green and sustainability trends in the near future

Full report will be available in October 2024

Source:

TRIREME
DIGITAL & GREEN SKILLS TOWARDS FUTURE OF THE MOBILITY ECOSYSTEM

Project Information

4-year ERASMUS+ Blueprint Project (2024 – 2028)

31 project partners from the Automotive Skills Alliance partnership

Support skills agenda in the Automotive-Mobility Ecosystem through the Large-scale Pact for Skills Partnership

AUTOMOTIVE SKILLS ALLIANCE

THE AUTOMOTIVE SKILLS ALLIANCE

INTRODUCTION

www.automotive-skills-alliance.eu

AUTOMOTIVE SKILLS ALLIANCE

- **Large-scale Pact for Skills Partnership in the Mobility-Transport-Automotive Ecosystem** to strengthen collective actions on skills

- Announced and officially **launched in November 2020**
- ASA became **legal entity** (non-profit organization) **in January 2022, established by ACEA, CECRA, CLEPA, ETRMA**

- More than **120 members** up to now

PACT FOR SKILLS Leader

An initiative of the European Commission

AUTOMOTIVE SKILLS ALLIANCE

- **Large-scale Pact for Skills Partnership in the Mobility-Transport-**

9. **Bridge skills gaps and address reskilling needs.** The transition towards electromobility, the digitisation of cars, and the further automation of car manufacturing will continue to change skills requirements in the automotive industry, including a growing demand for ICT and electrical engineering skills and falling demand for mechanical engineering and manual labour.

To support up- and reskilling of the workforce, Member States and particularly affected regions shall establish a common training framework. The framework [see also the chapter on skills] would build on a common set of minimum knowledge, skills, and competences necessary for specific professions. It would pool expertise and at the same time facilitate the mutual recognition of qualifications and related certificates[19]. The common framework could take the form of an 'Automotive Skills Academy', borrowing from the Skill Academies for cleantech sectors envisaged by the NZIA [see the chapters on skills and on clean tech], after monitoring the success of the latter. For automotives, the framework should include massive upskilling and reskilling in domains such as EV maintenance, cybersecurity, data processing, and automation.

The framework can build on the Automotive Skills Alliance. The latter could develop and provide courses for expert training, and act as platform for lifelong learning centres. The objectives of skill monitoring and the mutual recognition of training and training certificates across Member States and employers should also be maintained [see also the chapter on skills]. It will be important to particularly target SMEs with less capacity to develop their own training infrastructure and programmes and with possibly particularly acute reskilling needs (e.g. car part suppliers exposed to the transition for ICE vehicles to EVs).

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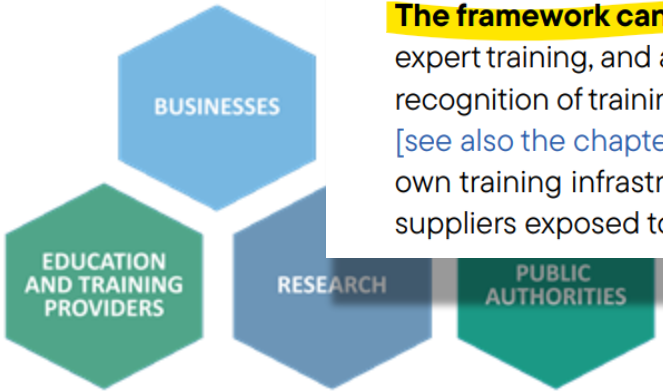


An initiative of the European Commission

MAIN BENEFITS OF THE COLLABORATION

ASA STRUCTURE – MEMBERS PARTICIPATION & COLLABORATION

ASA Partnership participate in Topic Committees, Working Groups & Task Forces

&

ASA builds upon the work carried out by strategic projects in the skills agenda for the ecosystem & **promotes and facilitates initiation of new projects/initiatives or support mainstreaming the existing once**

- TECHNOLOGICAL TOPICS
- EDUCATION AND TRAINING & PROMOTION OF INITIAL/LLL EDU
- DIVERSITY & ATTRACTIVENESS & SOCIAL ELEMENTS
- REGIONAL COLLABORATION AND IMPLEMENTATION

DRIVES – Development and Research on Innovative Vocational Education Skills
albatts – Alliance for Batteries Technology, Training and Skills
PIECE – EMPOWERING SUSTAINABLE SKILLS
FAST
ECEPE
CYBERENG
ICaBatt
EURO CLUSTERS
RESIST
PASS – Unlocking potential
aLIFEca
Flamenco – Forward Looking Approaches for Green Mobility Ecosystem Network Collaboration
TRiREME – DIGITAL & GREEN SKILLS TOWARDS FUTURE OF THE MOBILITY ECOSYSTEM
Voltage

AUTOMOTIVE SKILLS ALLIANCE

SUPPORT OF COLLABORATION & BEST PRACTICES SHARING

How to close the gap of skills needs and offer

www.automotive-skills-alliance.eu

Support of Knowledge Sharing

BaTT Forum for VET Teachers

- 1st BaTT Forum organized in Skeleftea, Sweden – October 2022
- 2nd BaTT Forum organized in Skoda Auto, Czech Republic – May 2023
- 3rd BaTT Forum organized in Bergen, Norway – 12-14 Dec 2023
- 4th BaTT Forum organized in Skeleftea, Sweden – 21-23 May 2024
- **Next Forums twice a year in 2024 and 2025**
- **Upskilling and sharing of the best practices among of VET teachers to support Batteries education and training (especially EQF 3-6)**

Hydrogen VET Forum

- Interactive workshops, expert meetings, and site visits, where **VET teachers** could learn about the essential role of **hydrogen in the automotive sector** firsthand from industry specialists.

- Organized by the **Automobile Club de l'Ouest**, the FIA World Endurance Championship, the **MissionH24** and its partners **Automotive Skills Alliance**, **Green Skills for Hydrogen** and **SPIRE-SAIS project (more info)**

AUTOMOTIVE SKILLS ALLIANCE

ASA’s COLLABORATION

ASA's Selected Collaboration

ASA & Automotive Regions Alliance & CoRAI: Working Agreement on a Strategic Partnership for a Just and Sustainable Transition of European Automotive Regions

ASA Strategic Partnership with

ASA member of

ASA is the Large-scale Partnership of the Pact For Skills Action

An initiative of the European Commission

AUTOMOTIVE SKILLS ALLIANCE

TOOLS TO SUPPORT TRAINING AND EDUCATION

To offer training courses up to date and relevant

ESCO Database

Skills Hub

(Catalogue, Micro-credentials, Reference definitions of Job Roles)

(LMS, hosting free MOOCs)

(hosted by individual providers/universities/VETs on their own costs)

Learning Platform

- **Other already existing courses/ Modules**
- **Training Module 1** (Online)
- **Training Module 2** (Online)

- Microlearning modules
- Learning Path -Combination of Modules
- Etc.

- **Other already existing courses/Modules** across the EU (irrespective of funging – private/public) - Paid or free
- **Training Course 1** (on-site, MOOC, VR, Lab Course)
- ...
- **Training Course 2** (on-site, MOOC, VR, Lab Course)

- **Learning Path – Combination of Modules/Training Courses** from different Providers to reach desired Job Role/level of Skill (combination of MOOC courses, onsite, etc.)
- **Issue micro-credentials – digital certificates**

Learning Platform

- Online platform for hosting online courses
- More than 60 online courses now and growing
- Free of charge

Erasmus+

DRIVES
Development and Research on Innovative Vocational Education Skills

albatts
Alliance for Batteries Technology, Training and Skills

ECEPE

aLIFEca

CYBERENG

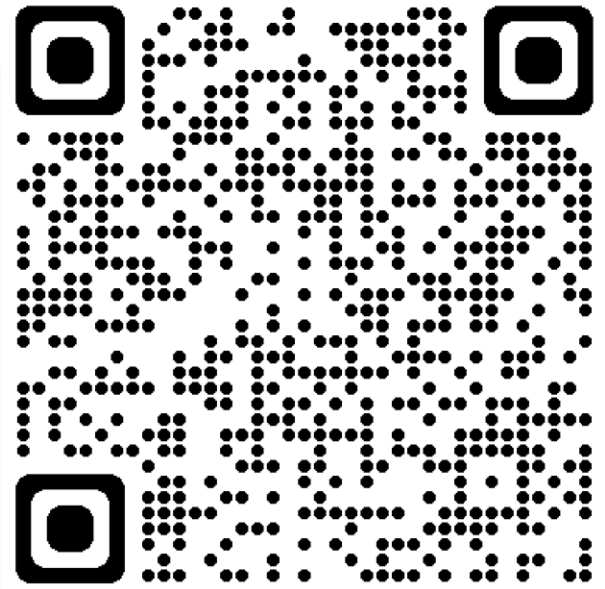
EURO CLUSTERS

RESIST

eit InnoEnergy
Skills Institute

Courses Free of Charge

Learning Platform



learn.skills-framework.eu

…and more coming

Learning Platform

- Online platform for hosting online courses
- More than 60 online courses now and growing
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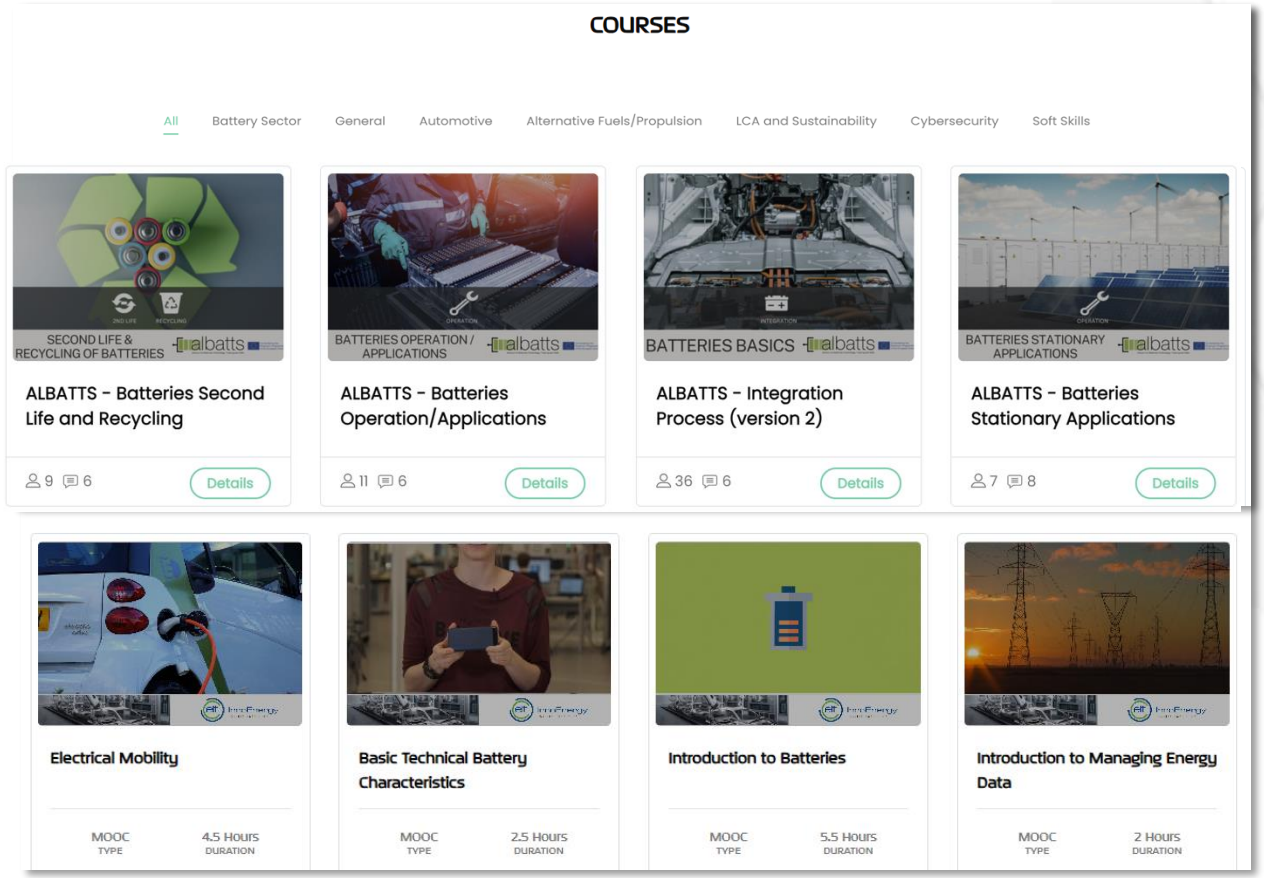


Learning Platform

learn.skills-framework.eu

Skills Hub

Skills Hub

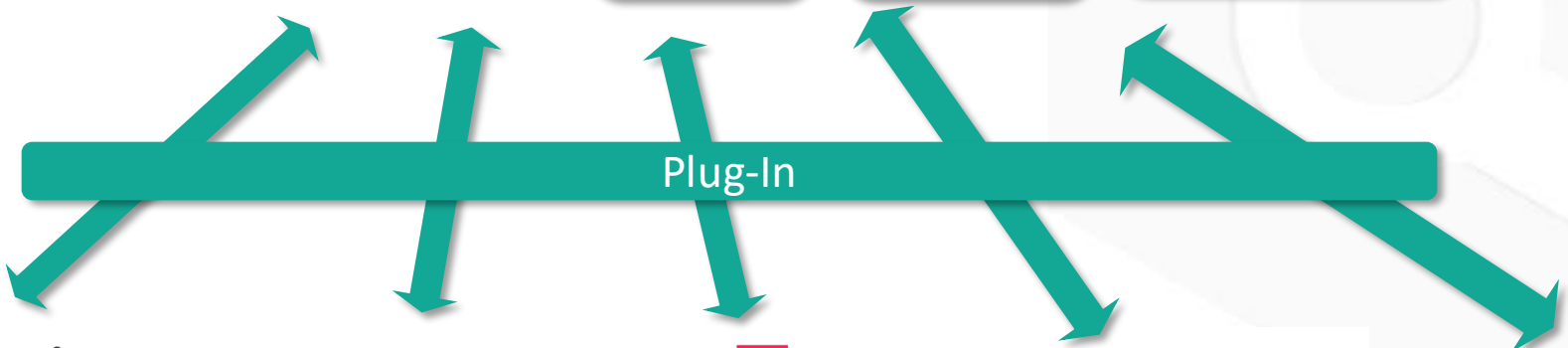
- **One-stop shop database for training courses** in the Automotive-mobility ecosystem
- Definition and **recognition of job roles** and skills/competence concepts using **micro-credentials (digital badges)**.
- More than **180 courses linked** - by providers according to coherent structure and mapping exercise

Skills Hub

Courses catalogue

Reference Job Roles Definitions

Digital Badges (microcredentials) in addition to existing full cert



https://skills-framework.eu

Learning Platform

EUROSPI² Academy

TU Graz

educam

...and much more

Skills Hub

Skills Hub

- **One-stop shop database for training courses** in the Automotive-mobility ecosystem
- Definition and **recognition of job roles** and skills/competence concepts using **micro-badges**.
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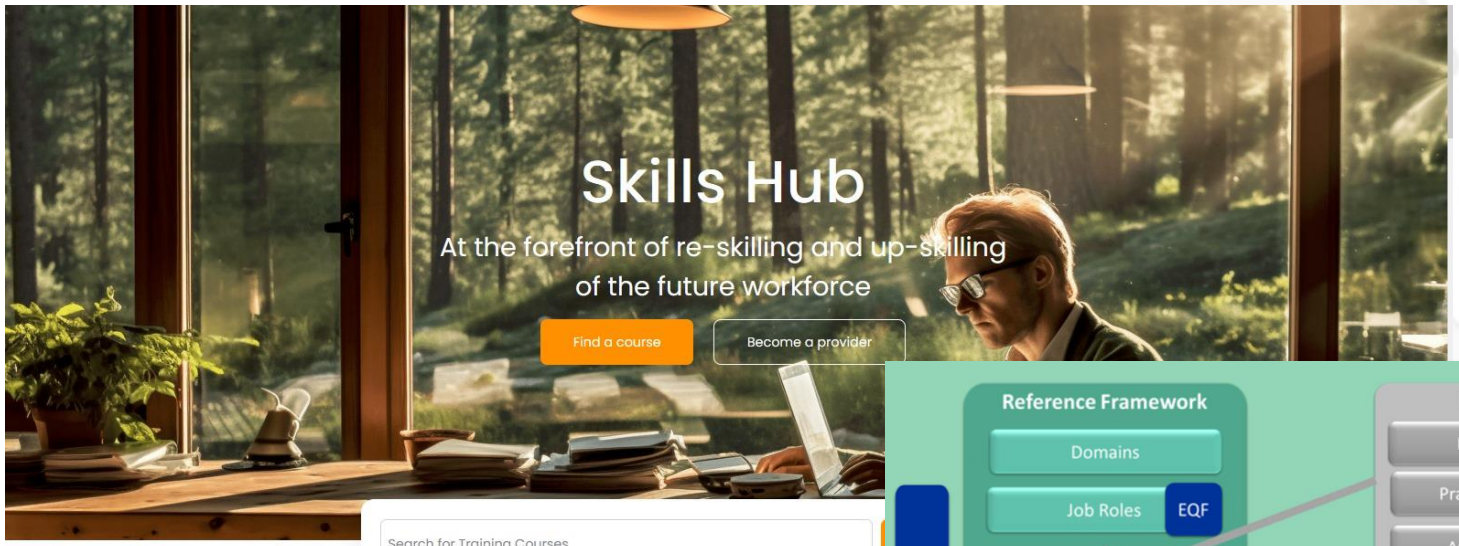
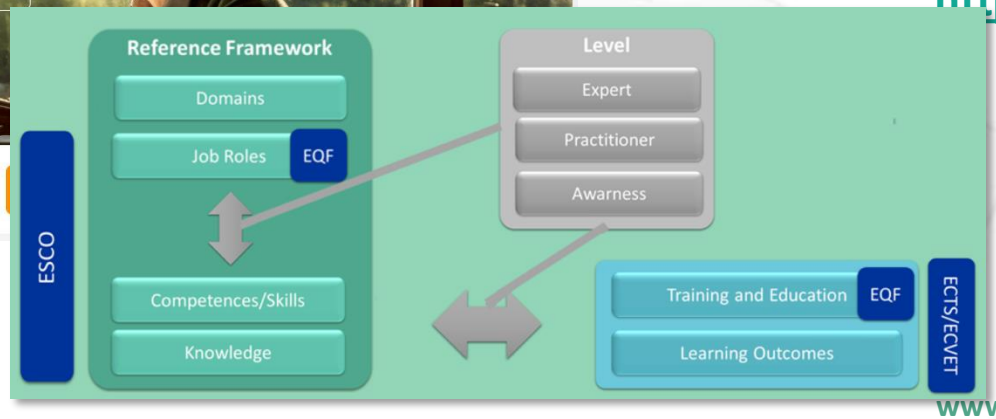




https://skills-framework.eu

Thank you for your attention !!

Contact me using LinkedIn:

AUTOMOTIVE SKILLS ALLIANCE

@ASA_MobilityEU

info@skills-alliance.eu

See more about ASA:

SURE5.0

Industry 5.0 webinar

How EIT Manufacturing supports the industry in upskilling and reskilling its resources

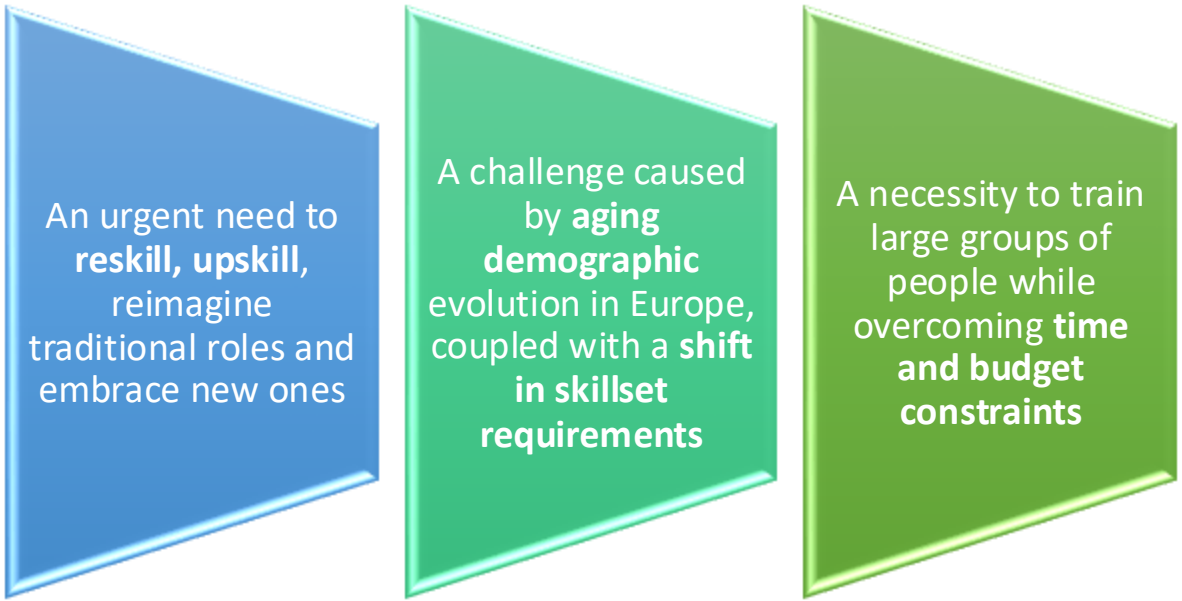
Funded by the European Union

Please, turn off your camera and mute your microphone

Skills gap, a critical challenge for the European manufacturing industry

"Over 32 million people employed in the manufacturing sector in the European Union, as of 2022, the most of any economic sector."

Source: Statista



Funded by the European Union

Organizations' perspective

Customised professional training

Challange	Our solution
Limited time for training	• Implement flexible training formats to accommodate employees' work commitments • Break down training into digestible modules for easier integration into daily schedules
Budget constraints	• Allocate resources strategically on critical skill gaps • Invest in high-impact training programmes
Resistance to change	• Foster a culture of openness and adaptability • Communicate the benefits of upskilling and reskilling clearly to employees, including career growth and competitiveness

Funded by the European Union

Learners' perspective

Customised professional training

Need	Our solution
Best performing content	• Cutting-edge content on technical and transversal skills, designed and delivered by top European Universities, RTOs and companies • Training programmes designed to motivate, inspire and engage learners
Time efficient	• Implement flexible training schedules to accommodate employees' work commitments • Break down training into smaller, digestible modules for easier integration into daily schedules
Brings value to the career path	• Provides high-impact training programmes • Acknowledges efforts and achievements with certificates of completion

Funded by the European Union

EIT Manufacturing Academy

Empowering professionals and students to master manufacturing skills and knowledge with top-tier trainings from Europe's leading experts

One of the largest European learning platform 100% dedicated to manufacturing, designed by leading specialists of the European manufacturing ecosystem to foster innovation and upskilling/reskilling challenges in the current and future workforce.

Funded by the
European Union

Online education achievements

Cumulated results from our learning platform 2021-2023

5 200+

Learners

230+

Courses available in the catalogue

60 000+

Lessons delivered

7 200+

Courses delivered

Funded by the European Union

Training focused on the key innovation and relevant technology topics

- AI & Data: Machine Learning, data spaces & analytics
- Industrial Metaverse : AR / VR, Digital Twins
- Industrial IoT
- Robotics – Cobotics
- Sensor technology
- QA: Computer Vision, Predictive maintenance
- Circular economy
- Net Zero
- Additive manufacturing
- Entrepreneurship
- Innovation management

Funded by the European Union

Top-rated content providers

Funded by the European Union

Blending formats for meeting different needs

E-learning modules

- Cutting-edge content on technical and transversal skills
- Theory- and case-based learning
- Diverse instructional design formats

Live sessions

- Consolidate knowledge
- Contextualize to learners own environment
- Apply theory, methods and tools to own projects
- Peer learn across disciplines

Practice

- Hands-on, in-person, training putting theory into practice
- Learning Factory workshops with dedicated providers across Europe

End-of-training

- Assessment of skills and competences
- Certification of Completion

Funded by the European Union

Connect with us
for a Collaborative Partnership!

Linda Ferro
EIT Manufacturing
Senior manager, Upskilling and Reskilling
linda.ferro@eitmanufacturing.eu

- Business managers
- HR managers
- Professors
- Content creators
- Learners

Funded by the
European Union

SURE5.0

Thanks for your attention

www.sureproject.eu

Funded by the
European Union

Enhancing Human Centricity via the Teaching Factory approach

Panagiotis Aivaliotis

Business Development Manager

[aivaliotis@teachingfactory-cc.eu]

Teaching Factory Competence Center

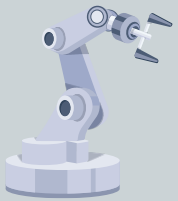
Based on **Teaching Factory (TF) concept**, our mission is to:

- **Enable the knowledge sharing** among the academia and industry.
- **Exploit Research Results** towards Industrial Applicability in **pilots**.
- **Integrate innovative Industry 4.0 technologies** in manufacturing.
- **Create added value for the services and products** of manufacturing companies.

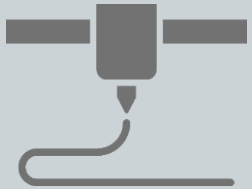
Teaching Factory Competence Center is the place where *innovation*, *engineering*, and *training* converge.

Technological Areas

Digital production & Industrial automation



Advanced Manufacturing Processes

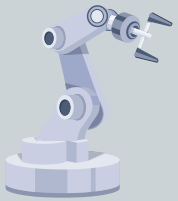


Mixed Reality & Sensing

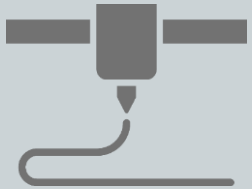
Industrial IoT Platforms & Communications

Technological Areas

Digital production & Industrial automation



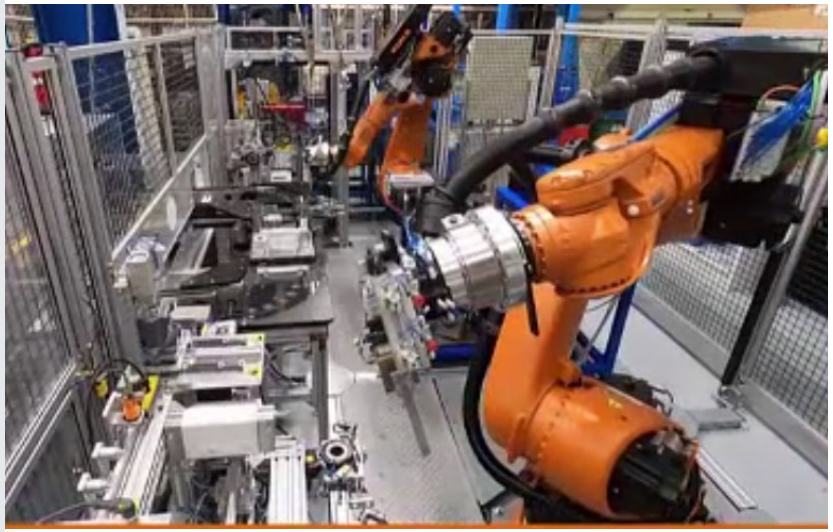
Advanced Manufacturing Processes



Mixed Reality & Sensing

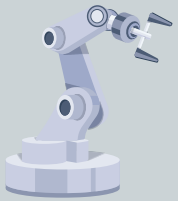
Industrial IoT Platforms & Communications

- Industrial Robotics
- Human Robot Collaboration
- Artificial Intelligence
- Advanced Production Planning
- Predictive Maintenance
- Smart Warehousing
- Digital Inspection
- Digital Supply Networks
- Digital Transformation



Technological Areas

Digital production & Industrial automation



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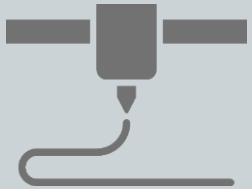
Advanced Manufacturing Processes



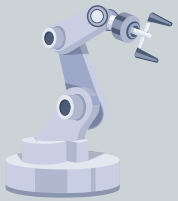
- Additive Manufacturing (AM) Process
- Digital Twins
- Process monitoring
- Thermal data gathering
- Real-time quality assessment
- Geometry reconstruction and adoptive
- CAM strategies
- Multi-scale process modelling
- Hybrid manufacturing

Mixed Reality & Sensing

Industrial IoT Platforms & Communications

Technological Areas

Digital production & Industrial automation



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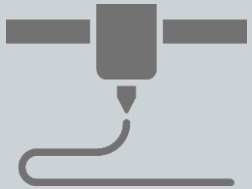
- Digital Transformation

Advanced Manufacturing Processes



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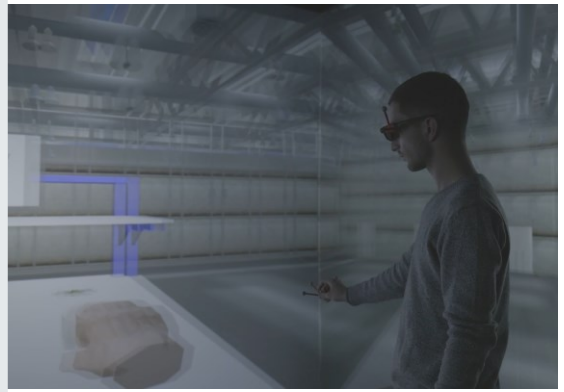
- Real-time quality assessment
- Geometry reconstruction and adoptive
- CAM strategies
- Multi-scale process modelling
- Hybrid manufacturing

Mixed Reality & Sensing

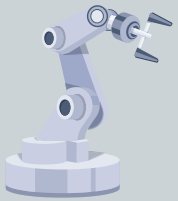
- Robot safety zones visualization
- Intuitive user interactions
- Online ergonomic evaluation
- Familiarization with HRC
- Virtual Collaborative Environments
- Human Motion Modelling & Simulation



Industrial IoT Platforms & Communications

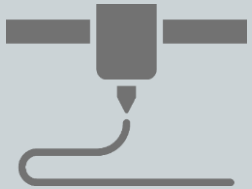
Technological Areas

Digital production & Industrial automation



- Industrial Robotics
- Human Robot Collaboration
- Artificial Intelligence
- Advanced Production Planning
- Predictive Maintenance
- Smart Warehousing
- Digital Inspection
- Digital Supply Networks
- Digital Transformation

Advanced Manufacturing Processes



- Additive Manufacturing (AM) Process
- Digital Twins
- Process monitoring
- Thermal data gathering
- Real-time quality assessment
- Geometry reconstruction and adoptive
- CAM strategies
- Multi-scale process modelling
- Hybrid manufacturing

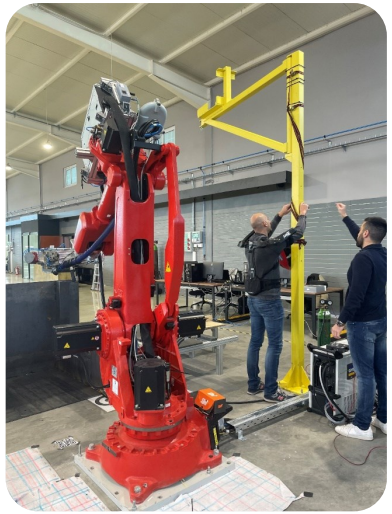
Mixed Reality & Sensing

- Robot safety zones visualization
- Intuitive user interactions
- Online ergonomic evaluation
- Familiarization with HRC
- Virtual Collaborative Environments
- Human Motion Modelling & Simulation

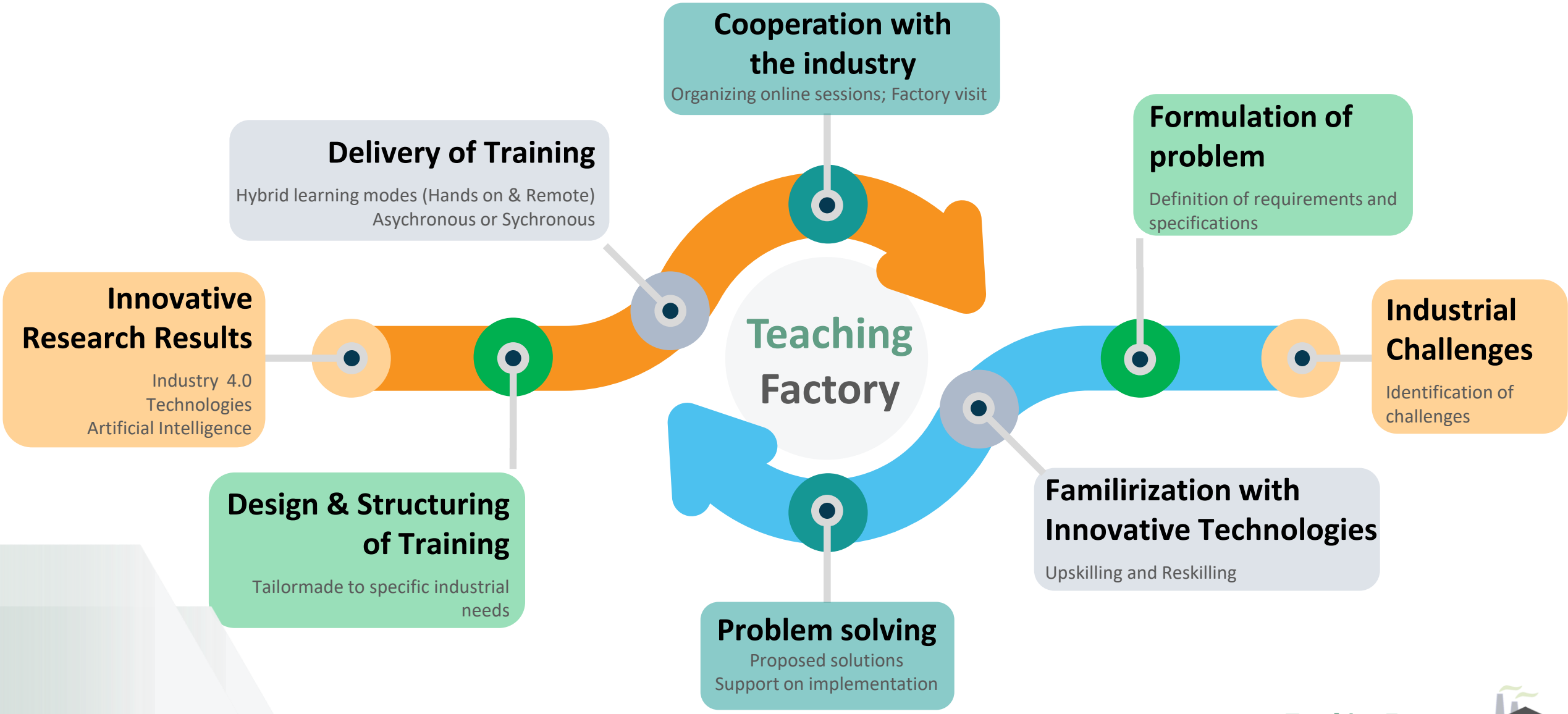
Industrial IoT Platforms & Communications

- Industrial Internet of Things
- Data analytics and visualization
- Shop floor scheduling
- Production network planning
- Cloud/edge

Industry Transfer Facilities



Teaching Factory Methodology



Our Services

- Technical
- Training
- Consulting
- "EIT Manufacturing"

Technical | **Training** | Consulting | "EIT Manufacturing"

Familiarizing engineers and operators with Industry 4.0 technologies.

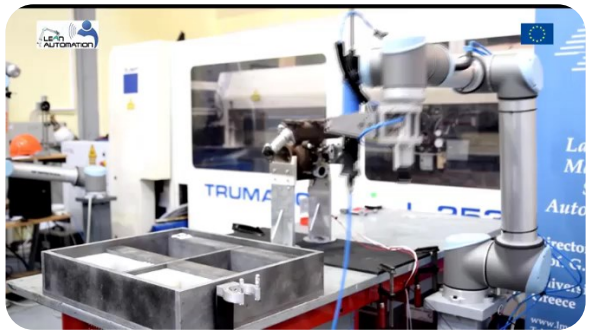
Topics of currently available training services:

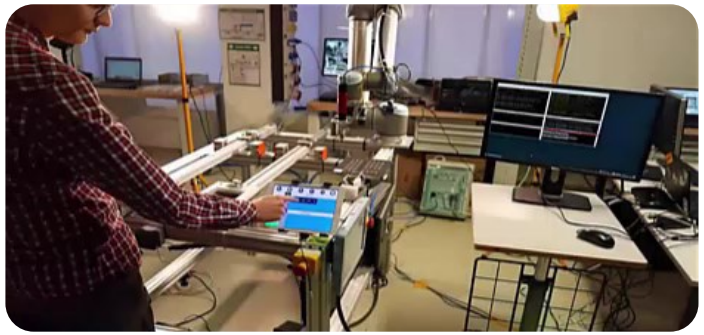
- *Health & Safety in the Context of Industry 4.0*
- *Collaborative Robotics*
- *Additive Manufacturing*

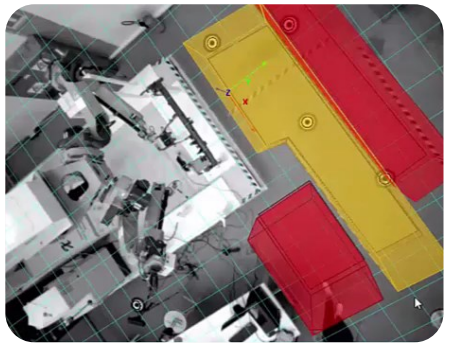
Training Services designed and delivered based on international standards.

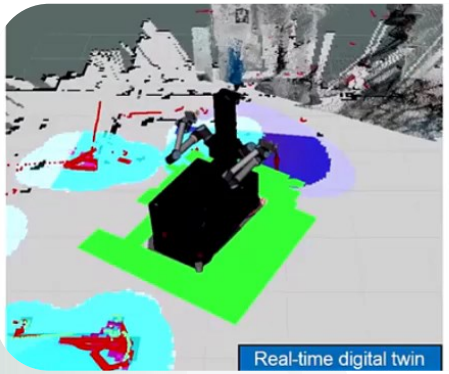
ISO 29993 TÜV NORD TÜV HELLAS SYSTEM CERTIFICATION

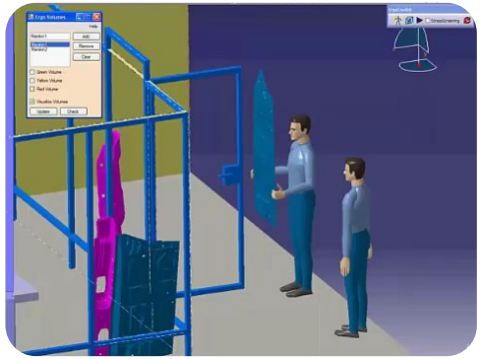
Robotics, Automation and VR in Manufacturing testbeds



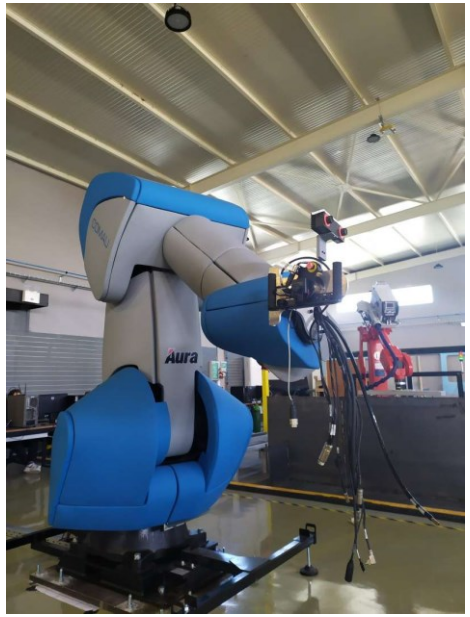




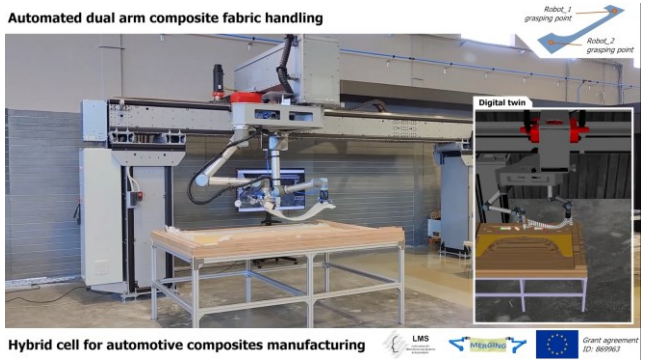




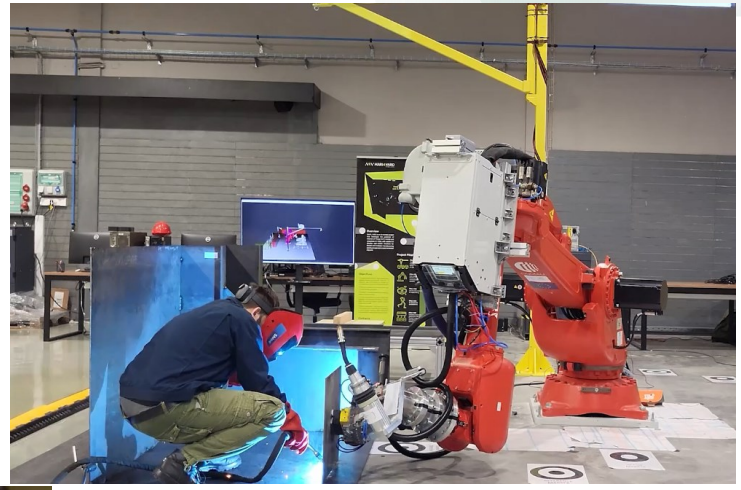
Applications - Demonstrators



High Payload Collaborative Robot

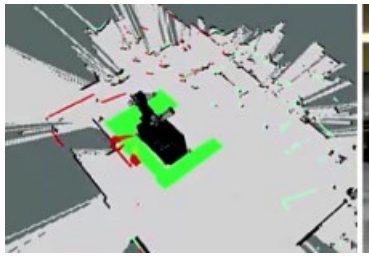


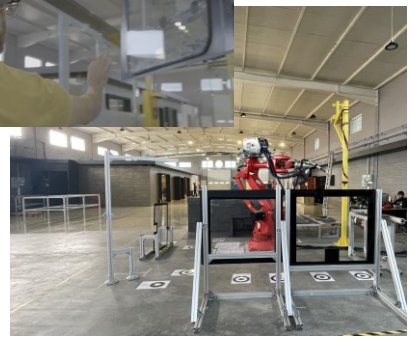
Automated dual arm composite fabric handling



High Payload Robot for Collaborative Welding

Mobile dual arm robot for automotive assembly





AI-enabled process monitoring and quality control
- Glue dispensing process

Industrial dual arm robot for automotive assembly

Digital Twin and AR-based tools for intuitive HRI
- Bus windows assembly

Teaching Factory
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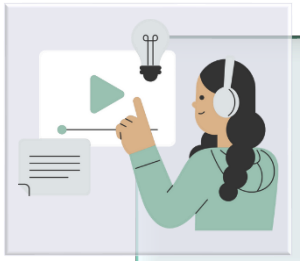
From design to delivery

Main parts of training service:

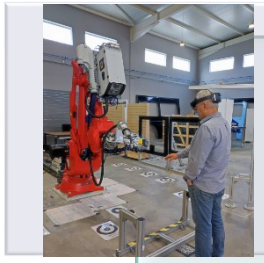
- Needs analysis
- Design & Development
  - *Curriculum*
  - *Training material and methods*
  - *Assessment of learning*
  - *Evaluation of service*
  - *Facilitators*
- Delivery
- Evaluation
- Dissemination

Training Sessions:



Session I:

- Introduction at Industry 4.0 technologies
- *IT-supported, Theoretical, self-paced*



Session II:

- Hands-on training and practical experience
- *Face-to-face, Practical*

Session III:

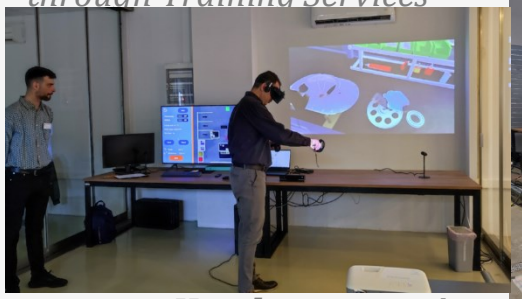
- Summary and potential applicability
- *Face-to-face or IT-supported, Consulting*

Health & Safety in the Context of Industry 4.0

Shaping together a safer workplace...

- Workplace ergonomic analysis
- Design of workplace based on ergonomic analysis via VR
- Cobots and Exoskeleton support
- Training on Safety scenarios via Industrial Metaverse
- Human tracking for zero access

Familiarizing engineers and operators with Industry 4.0 Technologies
through Training Services

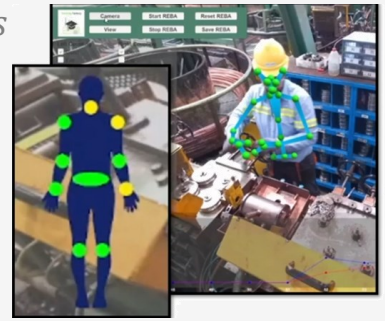


Hands-on experience
on industrial setups

Integrating Industry 4.0 technologies
through Technical Services

Operator Awareness Systems
using safety radars, laser scanners and AI cameras for pedestrian detection

Tailor made Safety Scenarios in VR
simulating real industry hazards in workplace digital replica



Ergonomic analysis on production station
through camera setup and ergonomic evaluation algorithms

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Training on Safety Scenarios via Industrial Metaverse

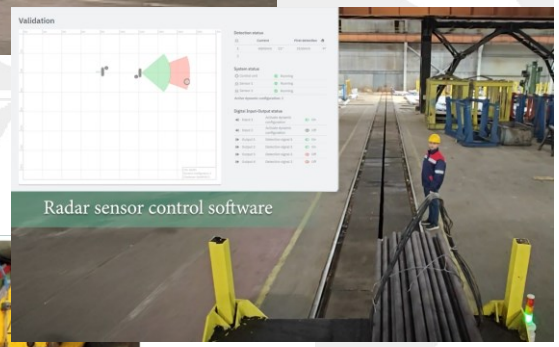




Virtual Reality Scenarios simulating the real-world hazards

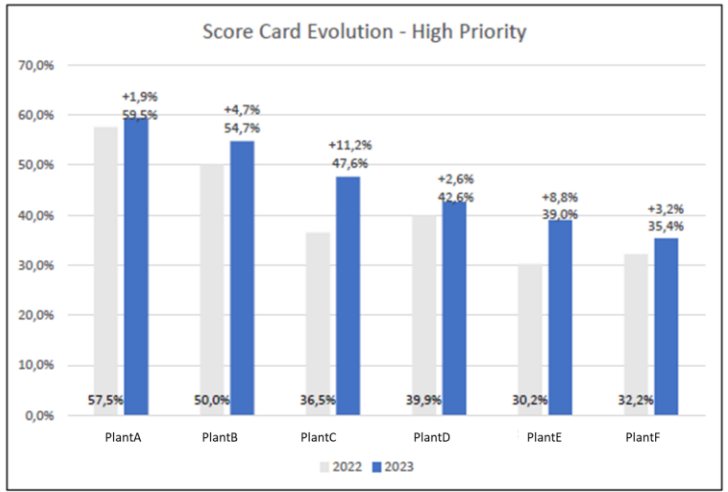
- ***Design and Development*** *of workplace* ***digital replica***
- ***Modeling of Scenarios*** *for safety training of employees*
- ***Increasing safety confidence*** *of employees*
- ***Eliminating training time*** *while operating*
- ***Upskilling and retention of competences*** *through continuous offline practicing*

Integration of Operator Awareness System



Trolley system: ***Safety Radar Sensors*** *integration*
Disksaw Machine: ***Safety Laser Scanner*** *integration*

- ***Increase of operator awareness*** *via vision and sound notifications*
- ***Increase of operator safety*** *in harsh manufacturing environments*
- ***Creating safer working conditions***



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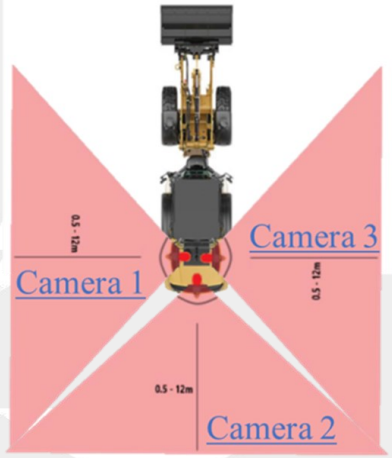
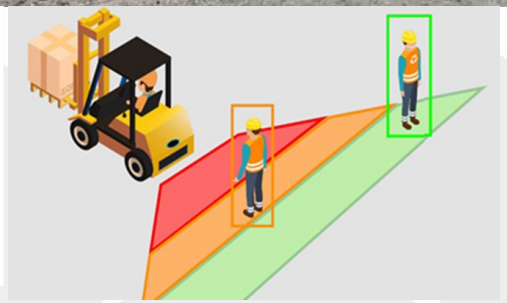
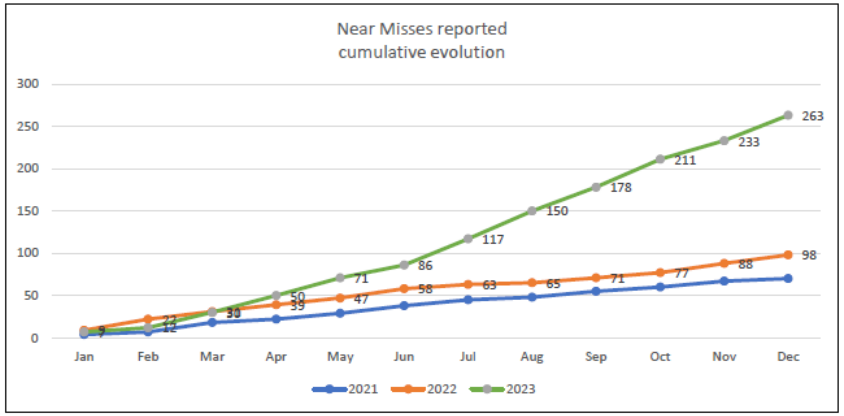
Integration of Pedestrian Detection System at Forklifts and Crane vehicles

*Installation of **AI cameras** for pedestrian detection and 7’ monitor inside the cabinet drivers*

- ***Increase of operator awareness** via visual and sound notifications*
- ***Easy reconfigurable** system to include more obstacles detection*
- ***Creating safer working conditions***







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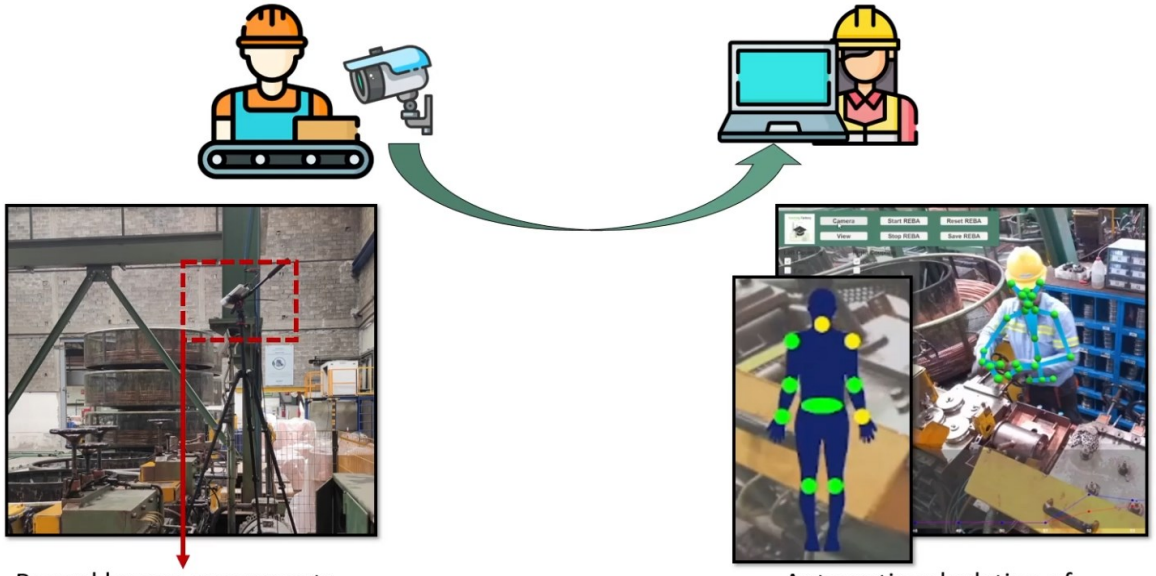
Ergonomic analysis on production station



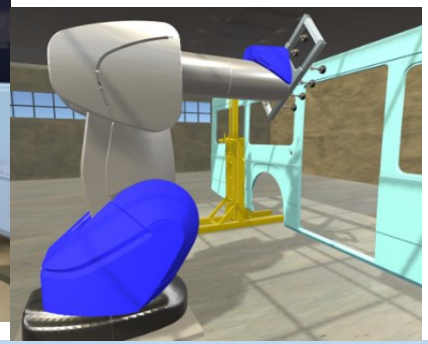
Record human movements through multi-camera setup

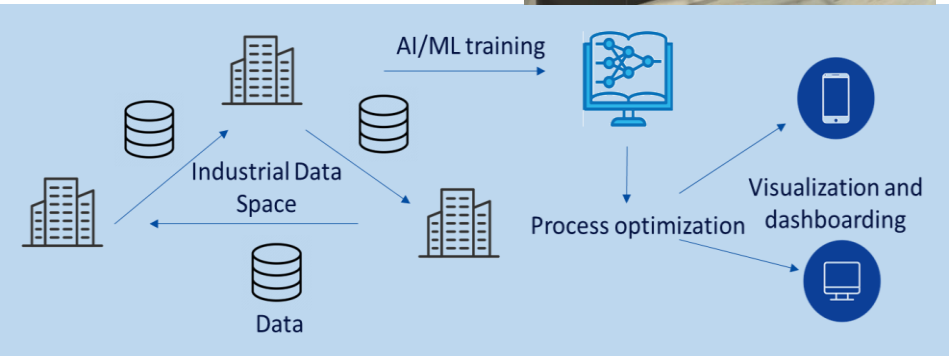
Automatic calculation of ergonomic scoresheet values

From manual to automatic calculation of ergonomic scores

- ***Record** of operator movements through **multi-camera setup***
- ***Automatic generation of KPI** through custom made software*
- ***Data monitoring** through interactive UI*
- ***Promoting Health and Safety Culture***

TF-CC testbed services





Teaching Factory Competence Center is also a place for **testing and experimentation**.

Our state-of-the-art industrial setups are available to prove your concepts and drive innovation forward!

- **Industrial Digital Twins**
- **Intuitive robot programming**
- **Dynamic robot task planning & resources orchestration**
- **Layout planning optimization**
- **AR & VR for operator support & training**
- **Industrial IoT platform, analytics & visualization**
- **Testing and development of industrial dataspaces (IDS/Gaia-X)**
- **Synthetic data for training machine learning models**
- **Monitoring of manufacturing processes, i.e. welding, additive manufacturing, milling**

Teaching Factory Competence Center

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Teaching Factory Competence Center

**Upskilling and Training,
Development and Implementation
of Advanced Technologies
for the Manufacturing Industry**

Thank you!

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aivaliotis@teachingfactory-cc.eu