



Strategic Approach to Engage Vocational Education Centres and Universities in the Welding CoVEs Network



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1. Introduction

The continuous and accelerating development of industry and industrial technologies cannot achieve without well-trained and open-minded professionals capable of meeting the challenges. Knowledge of green technologies and the routine use of digitalization in all areas of industry is a requirement, a necessity and a challenge too. This is no different in the field of welding in the wide sense (e.g. structural design, production planning, manufacturing, destructive and non-destructive testing, operation, maintenance). Education and lifelong-learning (upgrading of knowledge) tailored to complex needs is carried out at various levels, with vocational training centres and universities playing a key role. It is clear that synergies between the two groups of institutions are needed in order to meet the wide range of requirements. This document presents a strategic approach for the active involvement of VET centres and universities in the Welding CoVEs network.

1.1. Purpose of the Document

This document serves as a strategic roadmap for engaging vocational training centres and universities in the technical, especially in the welding sector. It details the objectives, challenges, methodologies, and actionable policy measures necessary to create a sustainable skills ecosystem that benefits industrial, educational and research sectors.

2. Objectives

The strategy is guided by four primary objectives, as follows.

Engagement and Collaboration: Establish a platform for vocational training centres and universities to be able to innovate their educational programs and develop newer educational programs that are in line with industrial and research needs, as well as general and sector-specific standards.

Curriculum Influence: Empower industrial actors and research institutes to voice their opinions on educational curricula, facilitating the integration of relevant topics and skills into training programs.

Ensuring Effective Knowledge Transfer: Developing mechanisms for the most effective occurrence of transferred or acquired knowledge in industrial and research applications.

Promoting Innovation: Encouraging vocational training centres and universities to contribute and adapt the development of innovative welding technologies and non-destructive testing

methods. This includes the exploration of new materials, design methods and production technologies, as well as sustainability considerations and digitalization requirements.

3. Strategic Focus

3.1 Challenges Faced by Vocational Education and Training Centres

Challenges of Rapidly Advancing Technology: The greatest challenge for vocational training is to respond to the needs of the labour market despite rapid technological changes. The INDUSTRY 4.0 has appeared in all sectors of vocational training, including welding and non-destructive testing technologies. From the perspective of vocational training management, reviewing the system of state-recognized training programs may be justified to support digitalization and the green transition. Training and outcome requirements need to be reassessed. The modernization of training content is essential. During the renewal of training programs, curricula must be redesigned based on the changing needs of the industry. Knowledge of digitalization and the green transition must be integrated into the curriculum of state-recognized vocational training programs and exam requirements in the short term.

Insufficient Output of Vocational Training and Low Enrolment Numbers: There is a shortage of well-trained professionals in welding and non-destructive testing technologies at the European level. New approaches and tools must be employed to support career orientation. The number of students in secondary vocational training must be increased. Increasing the number of well-trained professionals cannot be achieved solely through the school-based education system. Adult retraining and further education play a crucial role in addressing this issue.

Involvement of Companies in Training and the Development of Dual Education: Practical training at corporate locations plays a crucial role in welding and non-destructive testing technologies. The number of students participating in dual education must be increased. More companies need to be involved in dual education. Enterprises should be supported in implementing practical training.

3.2 Challenges Faced by Universities

Making the Institutions and their Training Offers Attractive: Strengthening the role of the institutions as “universitas”, developing and maintaining a training portfolio adapted to global and local needs, achieving attractive positions in international rankings.

Recognizing Industrial Needs: Understanding industrial processes, identifying and anticipating changes in industry, regularly reviewing and renewing training programs and facilities. (Making seemingly trivial changes is not an easy task because of the relatively long lead time of university courses.)

Flexibility: In addition to the classic BSc-MSc-PhD courses, there is a need to be prepared for postgraduate courses, shorter-term courses, external training in industrial companies, evening courses, weekend courses, summer schools etc.

Learning and Applying Modern Methods of Knowledge Transfer: Transferring these methods into practice requires both training of trainers and infrastructural development.

Creative Use of Artificial Intelligence (AI): Bringing AI to a level that is accessible to all is one of the biggest challenges in education. Overcoming stereotypes and prejudices and exploiting the potential of AI also requires training of trainers and infrastructure development.

4. Methodologies

4.1 The Methodologies Used by Vocational Education and Training Centres

Equipment Concentration: Teaching welding and non-destructive testing technologies in vocational education is among the costliest training programs. The concentration of equipment must be further strengthened, and the utilization of workshops equipped with modern technology needs to be improved.

Basic Mechanical Engineering Skills: In the initial phase of training, providing a broader education in the fundamentals of the mechanical engineering sector lays the groundwork for future career retraining and further education opportunities.

Project Based Learning: Project-based learning should be reinforced in vocational training. Instead of focusing solely on individual subjects, greater emphasis should be placed on tasks that require the creation of complex, real-world products within operations of enterprises.

Soft Skills: Key competencies (soft skills) development should be given a greater focus in training. Strengthening collaboration, problem-solving, and complex thinking skills is essential.

Training methods: To ensure flexible and effective education, shorter training programs should be organized. A prior knowledge crediting and validation system must be established. Distance learning opportunities should be strengthened during the theoretical knowledge transfer. The

potential of digital and multimedia learning materials should be utilized. In the teaching of welding technologies, simulation tools (welding simulators) should be applied.

4.2 The Methodologies Used by Universities

Cooperative Education and Research Projects: Initiating joint education and research projects: mainly with vocational training centres and industrial partners in the field of education, furthermore, mainly with research institutes and industrial partners in the field of research. The aim and content of the projects will be to explore (education and research), reflect (education) and solve (research) the challenges of welding and non-destructive testing methods. Among the projects, particular attention will be paid to the areas of green transition and digitalisation.

Publications: Encourage the publication of research results in high quality journals (e.g. personal performance evaluation), support publication (e.g. language support, article processing charge (APC) / publication fee support). Encourage the writing of technical books, in particular on new challenges and responses to them in the field of welding, including testing of welded joints.

Curriculum Development and Curriculum Writing: To support the synthesis and delivery of new knowledge in the form of learning materials, with a modular structure for different levels of training. Modern and flexible methods of knowledge transfer should be used in both the content and the form of the learning materials.

Professional Presentations, Workshops and Seminars: Organise regular meetings between the various actors (vocational training centres, universities, research institutes, and industrial partners) to get to know each other, identify challenges and exchange knowledge. The meetings are typically initiated by universities, but the venue varies and they are organised directly by the actor most closely linked to the chosen theme(s).

Support Programmes and Scholarship Schemes: The creation and hosting of various programmes with the dual aim: on the one hand, identifying, orienting and retaining talent, on the other hand exchanging experience and bridging gaps between the different fields.

5. Proposed Policy Actions

5.1 Proposed Policy Actions for Vocational Education and Training Centres

Career Orientation: Career orientation needs to be improved so that welding-related training programs become a realistic alternative for students facing career choices.

Curricula Development: The knowledge of digitalization and green transition must be integrated into the education of welding and non-destructive testing technologies.

Teaching Materials: The proportion of digital teaching materials used must be increased.

Training of Trainers: Teachers and trainers at dual training institutions must be prepared for new technologies through instructor training programs.

Infrastructural Development: The equipment of schools teaching welding and non-destructive testing technologies must be improved.

Number of Participants: The number of participants in dual training must be increased. Cooperation with economic actors should be established to ensure that companies participate in dual training to a greater extent. The number of participants in adult education must be increased. Based on validation, the duration of training programs should be shortened.

5.2 Proposed Policy Actions for Universities

Needs Assessment: To carry out a comprehensive assessment every training cycle compare the needs and training provision in welding and non-destructive testing. This involves working closely with industrial partners and research institutes to identify challenges and future needs as accurately as possible and to define time horizons.

Curriculum Development: Renewal of curricula and/or curricular elements, based on the results of comprehensive evaluations and focusing on areas related to the green transition and digitalisation.

Pilot Programmes: Launching pilot training programmes, primarily in project frames, to test and refine different curricular elements.

Funding Mechanisms: Exploring funding opportunities, with a particular focus on non-university actors and nationally and internationally funded projects.

Partnerships: Develop (new actors) and further develop (existing actors) collaborative practices with vocational training centres, partner universities, research institutes, industrial partners and other economic actors. The aim and focus of partnerships may be the same, but they may also be partly different, and it is therefore not necessary to seek the involvement of all actors in all areas (needs assessment, curriculum development, pilot programmes, and funding mechanisms). (Less is sometimes more!) More attention than at present should be paid to partnerships with the private sector.

6. Cooperation between Vocational Education and Training Centres and Universities

The key elements of the cooperation are as follows.

Strategic Agreements: Providing an effective framework for collaboration, universities and vocational training centres should establish strategic agreements. These framework agreements can be filled with specific content in different areas. Cooperation should already be present in the coordination of career orientation activities.

Career Guidance: During career-based guidance, students facing career choices that can be introduced not only to secondary-level vocational education but also to university studies, along with available career paths and income opportunities.

Equipment for Shared Use: Professional collaboration can improve the utilization of equipment. During secondary-level training, students can become familiar with specialized tools and instruments that are only available in university laboratories. In university education and further training, university students can use secondary school welding workshops for their short practical training sessions, so there is no need to set this up at universities.

University Credits for Knowledge Acquired at Secondary-level: Within the legal framework of the member state, universities can also recognize the knowledge acquired in secondary-level technical training by awarding credit points.

Training of Trainers: Universities should participate in the initial and continuing education of vocational training teachers.

7. Monitoring and Evaluation

Key performance indicators (KPIs) should be defined to ensure the effectiveness of the strategy and its implementation. In addition to defining the KPIs, the range of reliable data needed to define them and the methodology for collecting the data should be developed.

Cooperation Agreements: The number (quantitative side) and the content (qualitative side) of cooperation agreements that make a substantial contribution to the implementation of the strategy should be continuously monitored.

Institutions Involved in the Implementation of the Strategy: Number of institutions (quantitative side) and their role in the implementation (qualitative side).

Tracking Qualifications: Tracking qualifications and certificates achieved by participants in training programs. This provides insight into the effectiveness of curricula and the labour market readiness of graduates.

Gap Analysis: Conducting regular analyses to identify industry needs, skills provided by the workforce and gaps between different training courses. These data help to inform the renewal and adaptation of training programs and curricula.

Curriculum Renewal and Adaptation: Based on the results of the skills monitoring and gap analysis, necessary curriculum changes should be made.

Publications in the Field of the Green Transition and Digitalization: Number of publications (quantitative side) and where they are published (qualitative side).

8. Conclusions

The involvement of vocational training centres and universities in the Welding CoVEs network is key to transfer knowledge, develop professional skills, implement cooperation between different levels of training, and training of trainers. By implementing the strategic approach outlined in this document, the Welding CoVEs network can build strong partnerships with vocational training centres and universities. This can be resulted in a collaborative environment that will be conducive to continuous improvement in the fields of welding and non-destructive testing, furthermore green transition and digitalization. Common addressing potential challenges can be ensured the long-term success and sustainability of collaborations.



Strategic Approach to Engage Research Institutes in the Welding CoVEs Network



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1. Introduction

The Welding Centres of Excellence (Welding CoVEs) network represents a critical infrastructure for the development and dissemination of best practices in the field of welding with the focus on sustainability and digitalization. Integrating leading research institutes into the network is essential for promoting innovation, enhancing professional skills, and ensuring effective technology transfer. This document presents a strategic approach to actively engage research institutes in the Welding CoVEs network, outlining the necessary methodologies and operational tactics to consolidate this collaboration.

1.1. Purpose of the Document

This document serves as a strategic roadmap for engaging research institutes in the welding sector. It details the objectives, key principles, and actionable policy measures necessary to create a sustainable skills ecosystem that benefits both industry and education.

2. Objectives

The strategy is guided by four primary objectives:

Engagement and Collaboration: Establish a platform for research institutes to actively participate in shaping educational programs, ensuring they align with industry and research needs, and general and sector-specific standards.

Promote innovation: Encourage research institutes to contribute to the development of innovative welding techniques and technologies. This includes exploring new materials, processes and testing methods, implementation of automation and sustainable processes, and digitalization in welding processes and testing methods of welded joints.

Ensure Effective Technology Transfer: Develop mechanisms for the efficient transfer of research outcomes to different levels of education and practical applications in the industry.

Strengthen Collaboration: Foster partnerships between research institutes and the Welding CoVEs network to create a cohesive and productive community. This involves establishing joint ventures and cooperative agreements.



3. Strategic Focus

3.1 The Dual Transition: Green and Digital Technologies

The strategy emphasizes the importance of adapting to the dual transition impacting the welding sector. Key components include:

Green Technologies: The transition to sustainable welding practices necessitates a focus on eco-friendly materials and processes. This includes reducing emissions, minimizing waste, and adopting energy-efficient technologies. Companies will be encouraged to invest in training that promotes environmental responsibility.

Digital Transformation: The integration of digital tools such as automation, data analysis, and artificial intelligence is revolutionizing welding operations and the testing of welded joints. Companies need to embrace digital skills training to enhance productivity and remain competitive in the global market. Educational institutions will be encouraged to include digital literacy as a core component of welding training.

3.2 Challenges Faced by research institutes

Research Institutes in the welding sector encounter numerous challenges, including:

Resource Allocation: securing adequate funding and resources can be challenging.

Solution: Develop a strategic funding plan and seek multiple funding sources, including government grants and private sector investments.

Coordination: Coordinating activities between multiple stakeholders can be complex.

Solution: Establish a dedicated coordination team to manage communications and logistics.

Intellectual Property: Managing intellectual property rights can be a concern.

Solution: Create clear agreements that outline the ownership and usage rights of innovations developed through collaboration.

Cultural Differences: Differences in organizational culture between industry and academia can pose challenges.



Solution: Building cooperation based on bilateral and multilateral agreements, foster a collaborative culture through team-building activities and mutual understanding.

4. Methodologies

The strategic approach is anchored by four foundational principles:

4.1 Collaborative Research Projects

Initiate joint research projects between Welding CoVEs and research institutes to address specific challenges in the welding industry. These projects will focus on developing advanced welding technologies and materials testing methods, improving process efficiency, sustainability, digitalization and enhancing safety standards.

4.2 Workshops and Seminars

Organize regular workshops and seminars to facilitate the exchange of knowledge and ideas between researchers, academic and industry professionals. These events will cover a wide range of topics, including emerging trends, best practices, and case studies in welding and materials testing.

4.3 Internship and Fellowship Programs

Establish internship and fellowship programs to provide opportunities for researchers to gain hands-on experience in the industry. These programs will help bridge the gap between academic research and practical application.

4.4 Publication and Dissemination

Encourage the publication of research findings in reputable journals and facilitate their dissemination within the network. This will ensure that valuable insights and discoveries are shared with the broader welding community.

4.5 Technological Demonstrations

Organize demonstrations of new welding technologies and techniques, furthermore materials testing methods developed by research institutes, allowing industry professionals to observe and understand their practical applications.

5. Benefits of engagement

Engaging research institutes in the Welding CoVEs network offers several benefits, including:

5.1 Access to Cutting-Edge Research

Research institutes are often at the forefront of technological advancements. By involving them in the network, Welding CoVEs can access the latest research and innovations.

5.2 Enhanced R&D Capabilities

Collaboration with research institutes can enhance the research and development (R&D) capabilities of Welding CoVEs, leading to the development of new welding techniques and technologies, furthermore materials testing methods.

5.3 Increased Competitiveness

By leveraging the expertise of research institutes, Welding CoVEs can stay competitive in the global market and respond to industry demands more effectively.

5.4 Knowledge Sharing

The collaboration will facilitate the sharing of knowledge and best practices, helping to elevate the overall standards of welding practices within the network.

5.5 Sustainability Initiatives

Partnering with research institutes can drive the development of sustainable welding and materials testing practices and eco-friendly technologies, supporting environmental goals.

6. Monitoring the Efficiency of Implementation Actions

To ensure the successful engagement of research institutes in the Welding Centres of Vocational Excellence (CoVEs) network, it is essential to establish a robust monitoring framework. This framework will facilitate the continuous evaluation and improvement of implemented actions. The following steps outline the approach to monitor the efficiency of these actions:

6.1 Define Key Performance Indicators (KPIs)

Identify specific, measurable, achievable, relevant, and time-bound (SMART) KPIs to evaluate the success of each action. Examples of KPIs include the number of research institutes actively participating, the number of collaborative projects initiated, and the level of satisfaction among stakeholders.

6.2 Regular Data Collection and Analysis

Establish a systematic process for collecting and analysing data related to the KPIs. This may involve surveys, interviews, project reports, and other relevant data sources. Regular analysis will help identify trends, strengths, and areas for improvement.

6.3 Gap Analysis

Conduct periodic analyses to identify discrepancies between industry needs and the skills provided by the workforce. This data will inform adjustments to training programs and curricula.

6.4 Feedback Mechanisms

Implement feedback mechanisms to gather input from research institutes, CoVEs staff, and other stakeholders. This feedback will provide valuable insights into the effectiveness of the actions and highlight any challenges or barriers encountered.

6.5 Periodic Reviews and Adjustments

Conduct periodic reviews of the implemented actions based on the collected data and feedback. Adjustments should be made as needed to optimize the engagement strategy and ensure continuous improvement.

6.6 Reporting and Communication

Develop clear reporting procedures to communicate the monitoring results to all relevant stakeholders. Regular reports will keep everyone informed about the progress and impact of the engagement actions, fostering transparency and accountability.



7. Conclusions

Engaging research institutes in the Welding CoVEs network is crucial for driving innovation, enhancing professional skills, and ensuring effective technology transfer. By implementing the strategic approach outlined in this document, the Welding CoVEs network can build strong partnerships with research institutes and create a collaborative environment that fosters continuous improvement and excellence in welding practices. Addressing potential challenges proactively will ensure the long-term success and sustainability of these collaborative efforts.



Strategic Approach to Engage Industrial Companies in the Welding CoVEs Network



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1. Introduction

As globalization reshapes the industrial landscape, small and medium-sized enterprises (SMEs) in the welding sector face mounting pressures to innovate, improve efficiency, and adapt to rapidly changing market conditions. The dual transition to sustainable practices and digital technologies presents both challenges and opportunities for these businesses. To navigate these complexities and secure a competitive edge, the Project Consortium is committed to developing a robust strategy that not only attracts industrial companies but also empowers them to play an active role in shaping the future of workforce education and skills development.

1.1. Purpose of the Document

This document serves as a strategic roadmap for engaging industrial companies in the welding sector and their direct professional partners. It details the objectives, key principles, and actionable policy measures necessary to create a sustainable skills ecosystem that benefits both industry and education.

2. Objectives

The strategy is guided by four primary objectives:

Engagement and Collaboration: Establish a platform for industrial companies to actively participate in shaping educational programs, ensuring they align with industry needs, and general and sector-specific standards.

Curriculum Influence: Empower companies to voice their opinions on educational curricula, facilitating and ensuring the integration of relevant demands, topics, methods and skills into training programs.

Contribution to Teaching: Foster partnerships between industry and educational institutions to enhance and share teaching methodologies, development of curricula, tools, and resources used in welding education.

Regional Expansion: Develop a structured approach to networking within the welding sector, promoting local governance and stakeholder collaboration to optimize skills development and to use effectively of resources.



3. Strategic Focus

3.1 The Dual Transition: Green and Digital Technologies

The strategy emphasizes the importance of adapting to the dual transition impacting the welding sector. Key components include:

Green Technologies: The transition to sustainable welding practices necessitates a focus on eco-friendly materials and processes. This includes reducing emissions, minimizing waste, and adopting energy-efficient technologies. Companies will be encouraged to invest in training that promotes environmental responsibility, as well as in professional skills in the use of green technologies.

Digital Transformation: The integration of digital tools such as automation, data analysis, and artificial intelligence is revolutionizing welding operations. Companies need to embrace digital skills training to enhance productivity and remain competitive in the global market. Educational institutions will be encouraged to include competences for the application of digitalization as a core component of welding training.

3.2 Challenges Faced by SMEs

SMEs in the welding sector encounter numerous challenges, including:

Cost Pressures: Rising costs for materials, energy and labour necessitate that SMEs find innovative ways to reduce production expenses without compromising quality.

Laws and standards requirements: SMEs have to meet increasingly complex sustainability requirements without compromising business performance.

Operational Efficiency: SMEs must enhance their operational efficiency to compete with larger enterprises, requiring investment in skills development and new technologies. At the same time, they need to find the best practices to optimize their investments too.

Knowledge Sharing and Innovation: There is often a lack of structured opportunities for SMEs to share best practices, which can stifle innovation. The strategy aims to create collaborative platforms where knowledge can be exchanged.



4. Key Principles

The strategic approach is anchored by four foundational principles:

4.1 Anticipation of Skills Needs

Labor Market Analysis: Regular analysis of labour market trends will be conducted to identify emerging skills requirements in the welding industry. This includes understanding the impact of technological advancements, and general and sector-specific regulatory changes.

Skills Forecasting Framework: Develop a forecasting framework that assesses future skills needs, considering factors such as industry growth projections, technological innovations, and sustainability initiatives.

4.2 Developing Skills Supply

Curriculum Alignment Initiatives: Collaborate with educational institutions to design curricula that reflect current and anticipated industry needs. This collaboration will ensure that learners in addition to traditional knowledge acquire skills in green technologies and digital competencies relevant to modern welding practices.

Specialized Training Programs: Create targeted training programs that address specific skill gaps identified through labour market analyses. Programs may include short-term training and retraining for company employees as well as certifications in emerging technologies or sustainable practices.

4.3 Activating Skills Demand

Industry Partnerships and Collaborations: Establish formal partnerships with local businesses to promote the hiring of trained individuals. These partnerships can facilitate the development of dual training, internship and apprenticeship programs that provide hands-on experience for learners.

Employer Engagement Initiatives: Encourage employers to actively participate in skills development initiatives, offering substantive input on training content and delivery. Regular meetings and workshops will facilitate this collaboration.

4.4 Improving Governance and Financing of Skills Policies

Robust Governance Structures: Developing a set of proposals at strategic level, adaptable to each country, suitable for the development of cooperation and education systems that enable effective collaboration among industry stakeholders, educational institutions, and government entities. This may involve forming advisory committees that include representatives from all sectors.

Diverse Funding Strategies: Identify and secure funding sources to support skills development initiatives. This includes exploring public grants, private sector investments, and partnerships with non-governmental and philanthropic organizations.

5. Proposed Policy Actions

To achieve the outlined objectives, the following targeted policy actions will be implemented:

5.1 Skills Needs Assessment

Regular Skills Assessments: Conduct comprehensive assessments at least annually to identify skill gaps and emerging trends within the welding industry. This will involve collaboration with industry leaders to gather insights on current challenges and future needs.

Stakeholder Engagement: Utilize surveys, focus groups, and workshops with industry stakeholders to gather qualitative data on skills needs and training requirements, furthermore to approach the demands for human resource. This participatory approach will ensure that the strategy reflects the voices of those directly affected.

5.2 Career guidance

Fulfil the industry's requirements related to labour needs: Based on labour market requirements, media campaign and information events have to be organized for the target audience. Thus, that people who are about to choose or change their career are aware of the possibilities of a career in welding.



5.3 Curriculum Development

Collaborative Curriculum Design: Work closely with industry partners to design curricula that incorporate practical skills training, advanced and green technologies, and digital competencies. Green and digital skills will also be included in the final exams at the end of training. Input from employers will be critical in ensuring the relevance and effectiveness of training programs.

Pilot Training Programs: Launch pilot training programs in collaboration with educational institutions to test and refine new curricula. The pilot trainings will take place at the bases of industrial partners and educational institutions, using rational sharing. Feedback from participants and industry partners will inform continuous improvement efforts.

5.4 Industry Partnerships

Establishment of Apprenticeship Programs: Develop structured apprenticeship programs in collaboration with local businesses, providing on-the-job training and mentorship for participants. This hands-on experience is crucial for building industry-ready skills.

Facilitation of Internship Opportunities: Create a platform for students in welding programs to access internship placements with local companies, ensuring they gain practical experience in real-world settings.

5.5 Funding Mechanisms

Exploration of Grants and Scholarships: Identify and apply for grant opportunities to fund infrastructural and skills development initiatives. In addition, supporting scholarship programs for students pursuing a career in welding, especially those focused on green and digital technologies.

Public-Private Partnerships: Encourage collaboration between public and private sectors to invest in skills development and training infrastructure. Joint initiatives can enhance the reach and impact of skills training programs.



6. Monitoring and Evaluation

To ensure the effectiveness of the strategy and its implementation, a set of key performance indicators (KPIs) will be established:

6.1 Employment Rates

Tracking Employment Levels: Monitor employment rates within the welding sector to evaluate the success of training programs and initiatives. Regular reporting will help stakeholders understand the necessity and impact of skills development efforts.

6.2 Education Attainment

Monitoring Qualifications: Track the qualifications and certifications achieved by participants in training programs. This will provide insights into the effectiveness of curricula and the preparedness of graduates for the workforce, furthermore may give the main directions for the changes needed.

6.3 Skill Mismatch Analysis

Gap Analysis: Conduct periodic analyses to identify discrepancies between industry needs and the skills provided by the workforce. This data will inform adjustments to training programs and curricula.

6.4 Wages and Earnings

Economic Impact Assessment: Evaluate wage trends in the welding industry as a measure of the economic impact of skills development initiatives. Changes should be analysed at both national and international levels. Higher wages may indicate successful training outcomes and increased demand for skilled labour.

6.5 Innovation and Productivity Metrics

Performance Assessment: Assess levels of innovation and productivity within the welding sector to gauge improvements resulting from enhanced skills and training programs. Metrics may include the adoption of new technologies and processes, furthermore quantifying the ratio of dual (green and digital) transition, both separately and collectively.



7. Conclusions

The strategy outlines a comprehensive approach to engaging industrial companies in the welding sector with the CoVEs network. By focusing on the dual transition of green and digital technologies, the strategy aims to foster collaboration, anticipate skills needs, and improve governance for skills policies. The Project Consortium is committed to strengthening the competitiveness of SMEs in the global market through this strategic engagement. By actively involving industry stakeholders and creating a structured framework for skills development, this strategy will contribute to the long-term success and sustainability of the welding sector and its workforce. Through innovation, collaboration, and a shared vision, the welding industry can adapt to the challenges ahead while fostering growth and opportunity for all stakeholders involved.



Survey on opportunities for industrial - academic collaborations in welding research and technology



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1. Introduction

Purpose of the Survey

- We are exploring opportunities for industrial - academic collaborations in welding research and technology.
- Privacy and data protection is very important to us. The data collected will be stored in compliance with the existing European standards (GDPR).

Instructions

- This survey should take approximately 5-10 minutes to complete.
- Participation in this survey is voluntary and we would like to thank the respondents.

2. Company Background

Which industrial sector does your company primarily operate in?

- Automotive
- Aerospace
- Oil & Gas
- Structural/Construction
- Shipbuilding
- Other (please specify)

What is the approximate size of your company?

- Fewer than 50 employees
- 51–250 employees
- 251–1,000 employees
- More than 1,000 employees

Where is your company located (country/region)?

- Provide space for open text or a dropdown list of regions.

Which types of welding processes are most relevant to your business? (Select all that apply)

- MIG/MAG (GMAW)
- TIG (GTAW)
- Stick Welding (SMAW)
- Submerged Arc Welding (SAW)
- Laser Welding
- Friction Stir Welding
- Others (please specify)

3. Current Challenges and Needs

What are your main challenges related to welding?

(Select all that apply)

- Quality/defect reduction
- Productivity/efficiency improvements
- Cost reduction for materials or processes
- Automation and robotics integration
- Skilled labour shortage
- Health and safety concerns
- Other (please specify)

What factors might motivate your company to invest in industrial-academic collaborations?

(Select all that apply)

- Access to specialized equipment
- Access to specialized expertise
- Focused solutions to specific production problems
- Potential cost savings
- Improved competitiveness and innovation
- Joint funding opportunities
- Other (please specify)

4. Collaboration Experience and Interest

Has your company previously collaborated with academia or research institutions on welding - related projects?

- Yes, extensively
- Yes, occasionally
- No, not yet

If “Yes,” please provide brief details of the nature of these projects and their outcomes.

How interested would your company be in pursuing new or further collaborations with academic or research partners?

- Very Interested
- Somewhat Interested
- Neutral
- Somewhat Disinterested
- Not Interested

What types of collaboration structures would be most appealing to your company? (Select all that apply)

- Joint R&D projects
- Contract research or consulting
- Use of specialized lab facilities at universities or research institutions
- Internships/mentorship programs for students
- Workshops or short training programs
- Other (please specify)

5. Scope of Potential Collaboration

Which areas of welding technology or applications would your company prioritize for academic - research collaboration?

- Implementation of advanced welding techniques (e.g., laser or friction stir)
- Material innovations (e.g., new alloys, dissimilar material joining)
- Non-destructive testing or inspection methods
- Process monitoring and control (e.g., sensors and data analytics)
- Metallurgical analysis
- Automation and robotics in welding
- Other (please specify)

What is the typical timeline your company envisions for seeing results from a collaborative R&D project?

- Short term (less than 6 months)
- Medium term (6–18 months)
- Long term (18+ months)

Which key performance indicators (KPIs) would your company use to assess the success of a collaborative project?

- Reduction in defects or rework
- Decrease in production costs
- Improvement in production speed/efficiency
- Implementation of new products or processes
- Patents or publications resulting from the project
- Other (please specify)

6. Barriers to Collaboration

What barriers might prevent your company from pursuing collaboration with academia and research institutions? (Select all that apply)

- Lack of internal resources (time or staff)
- Funding constraints or budget limitations
- Unclear intellectual property agreements
- Long development times
- Difficulty in matching research focus with real-world needs
- Cultural or communication gaps
- Other (please specify)

What would help overcome these barriers?

- Government or industry grants/funding
- Clear contractual/IP frameworks
- Joint steering committees to align research goals with industrial needs
- Frequent communication and progress updates
- Other (please specify)

7. Closing and Additional Comments

Would you like to receive follow-up information or guidance about potential collaboration opportunities?

- Yes (please provide your contact details)
- No

Please share any additional comments or suggestions related to industrial-academic collaborations in the welding sector.

- Open text field

8. Thank You Note

Thank you for your time and insights!

Your responses will help us understand how best to facilitate collaborations and drive innovation in the welding sector.