



Applied Innovation and Research in
Vocational Education and Training

DISSEMINATION OF AR DIGESTS 2023 & 2024

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D6.6 DISSEMINATION OF AR DIGESTS

Lead partner	ISSO
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Produced by	ISSO
Main author	Dirk de Wit, Daniella Mazzini
Co-authors	Martijn van Bommel (ISSO), Matilde Revelli (EURASHE), Iñigo Araiztegui, Iñigo Mujika, Jone Etxebeste (TKNIKA), Edurne Bilbao (IMH), Josu Riezu (AFM), Barbara van Ginneken, Joan Vandehoek, Miriam Korstanje (KTPT), Melanie Henke, Maëla Barçon (HP), Henning Klaffke, Christopher Höhn (BHH), Diane Burt (NBCC)
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PUBLISHABLE EXECUTIVE SUMMARY

This document summarizes the key activities of the AIRinVET project from January 2023 to December 2024, overseen by ISSO for the regular dissemination of AIRinVET digests. These digests are dissemination documents elaborated from the different reports and interventions carried out by the consortium; the Mapping of Applied Research in VET, Contextualization of the concept of Applied Research in VET, Building bridges for SMEs engagement & AR mindsets in VET, Structures for Applied Research, and the Interventions for new approaches in Applied Research.

These digests are part of the general dissemination strategy. ISSO, in partnership with the project coordinator, led the strategy for spreading information about AIRinVET through these digests. Tknika created a plan to help all partners effectively develop these digests to communicate and share information.

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1. INTRODUCTION

This report summarizes the key activities of the AIRinVET project from January 2023 to December 2024, overseen by ISSO for the regular dissemination of AIRinVET digests. Digests are dissemination documents elaborated from the different reports carried out by the consortium: the Mapping of Applied Research in VET, Contextualization of the concept of Applied Research in VET, Building bridges for SMEs engagement & AR mindsets in VET, Structures for Applied Research, and the Interventions for new approaches in Applied Research.

The digests are part of the general dissemination strategy. ISSO, in partnership with the project coordinator, led the strategy for spreading information about AIRinVET through these digests. Tknika created a plan to help all partners effectively develop these digests to communicate and share information.

With this report, the reader gets an overview of how the AIRinVET team has worked with the digest and has access to the full set of digests made, because they all are included in the appendix of this report.

2. DIGESTS PLANNING

The digests are short written reports providing the most important parts of the larger reports developed during project lifetime. The digests are aimed to disseminate the results achieved in the project in the most accessible way. The documents created are focused on a specific topic and are short read. They are part of the external communication strategy and were planned to follow the deliverables production.

Overview and proposed planning of the digests

The planning included the topic of each digest, the source documents, and a suggested timeline to produce it.

1. Digest, process (including glossary), and interviews – source: D2.2 Publication on AR actors, business models and case studies carried out by VET/HVET institutions worldwide.
2. Digest, findings – source: D2.2 Publication on AR actors, business models and case studies carried out by VET/HVET institutions worldwide.
3. Digest, policy & financial models' findings – source: D2.2 Publication on AR actors, business models and case studies carried out by VET/HVET institutions worldwide.
4. Digest, SMEs engagement in AR in VET – source: D3.2 SMEs ENGAGEMENT & AR MINDSETS report.
5. Digest, Engagement of VET centres AR – source: D3.2 SMEs ENGAGEMENT & AR MINDSETS report.
6. Digest, Framework for AR in VET – source: D4.3 Roadmap for AR in VET.
7. Digest, Roadmap for AR in VET – source: D4.3 Roadmap for AR in VET.
8. Digest, intervention procedure, EURASHE – source: D5.2 Report on interventions.
9. Digest, Intervention 1: Extrapolate Tkgune, Euskadi – source: D5.2 Report on interventions.
10. Digest, Intervention 2: Extrapolate Katapult's experience, the Netherlands – source: D5.2 Report on interventions.
11. Digest, Intervention 3: Adapt RTOs/universities approach to VET contexts, EURASHE – source: D5.2 Report on interventions.
12. Digest, Intervention 4: Enhance learners' curriculum – Application of work process analysis (WPA) for SMEs in house trainings case, Germany – source: D5.2 Report on interventions.
13. Digest; Intervention 5: Extrapolation of the Framework for experiential learning and renewed core employability competencies. New Brunswick Community College (NBCC)'s experience, Canada – source: D5.2 Report on interventions.

The timeline of the production of the digests is shown in Table 1.

Publication date	#	Content	Partner
November 2023	1	Process (including glossary), and interviews	Tknika
December 2023	2	Findings	Tknika
January 2024	3	Policy & financial models' findings	EURASHE
March 2024	4	Building bridges in AR in VET	HP
April 2024	5	Recommendations	EURASHE
April 2024	6	Framework for AR in VET	Katapult
May 2024	7	Roadmap for AR in VET	Katapult
June 2024	8	intervention procedure, EURASHE	EURASHE
July 2024	9	Intervention 1: Extrapolate Tkgune, Euskadi	Tknika
August 2024	10	Intervention 2: Extrapolate Katapult's experience, the Netherlands	Katapult
September 2024	11	Intervention 3: Adapt RTOs/universities approach to VET contexts, EURASHE	EURASHE

October 2024	12	Intervention 4: Enhance learners' curriculum - Application of work process analysis (WPA) for SMEs in house trainings case, Germany	BHH
November 2024	13	Intervention 5: Framework for experiential learning and renewed core employability competencies. NBCC, Canada	NBCC

Table 1 Planning of the digests

The responsibility to produce the digests lies on the partner responsible of the deliverable or the work package they belong to. If needed, for example for the interventions, the production of the digest is done in close collaboration with the partner responsible for the intervention.

All digests will be reviewed by at least one project partner before their publication and dissemination.

Target audience

For the target group of these digest we have identified three key groups based on the area they cover:

- Policy Makers: policy makers at different decision levels local/regional, national, international, academic authorities, institutions, social partners, civil society.
- Education: VET/HVET providers, teachers, students/trainees/learners/workers, entrepreneurs, alumni, other education sectors.
- Business: companies, including SMEs, industry representatives, employers' associations, trade Unions.

It is important to note that the list above is not exhaustive, and other stakeholders may be added depending on the specific context of the project activities and outputs.

3. DIGESTS PUBLICATION

By December 2024, all digests are published. By the publication of the digests, some changes were made to the original planning as shown in chapter 2. The digests about the interventions were made directly after performing the intervention, in accordance with the planning of the interventions instead of the proposed planning of the report on the interventions. By presenting some topics from a report in a separate digest, the total number of digests increased with one, getting a total of 14. An overview of the published digests is shown in Table 2. The digests are included in the appendix.

Publication date	Digest	Content	Link
October 2023	01	Supporting AR in VET (Policy & financial models' findings)	Digest 01
November 2023	02	Mapping AR in VET (process and findings)	Digest 02
November 2023	03	Case studies examples (DE, NL, ES)	Digest 03
December 2023	04	Why do we need a glossary?	Digest 04
Januari 2024	05	Mapping interviews examples (DE, NL, ES)	Digest 05
March 2024	06	Applied research engagement and mindsets	Digest 06
April 2024	07	Applied research in VET in the Basque Country	Digest 07
June 2024	08	Enhance learners' curriculum - Application of work process analysis (WPA) for SMEs in house trainings case, Germany	Digest 08
July 2024	09	Extrapolate Katapult's experience, the Netherlands	Digest 09
July 2024	10	Adapting RTOs universities approaches and building collaborations with VET contexts	Digest 10
Augusts 2024	11	Applied research as a form of experiential learning in VET program curricula	Digest 11
November 2024	12	Framework for Applied Innovation and Research in VET: Driving Change in Vocational Education	Digest 12
November 2024	13	AIRinVET Roadmap: Building Research & Innovation in VET Centres	Digest 13
December 2024	14	Recommendations	Digest 14

Table 2 Publication of the digests, with links to the project website of AIRinVET

3.1 Digests dissemination

Digests are published on the project website and also with a post on the LinkedIn-page of AIRinVET and in a specific section in the issues of the project newsletter. With publishing the digests on social media, like LinkedIn, it is easy for the partners to share them with their own networks. Partners can translate the digests if necessary to reach specific audience. This will be done during the project lifetime and afterwards.

APPENDIX – DIGESTS

The digests are presented in the order they are published, following the table below.

Digest	Content
01	Supporting AR in VET (Policy & financial models' findings)
02	Mapping AR in VET (process and findings)
03	Case studies examples (DE, NL, ES)
04	Why do we need a glossary?
05	Mapping interviews examples (DE, NL, ES)
06	Applied research engagement and mindsets
07	Applied research in VET in the Basque Country
08	Enhance learners' curriculum - Application of work process analysis (WPA) for SMEs in house trainings case, Germany
09	Extrapolate Katapult's experience, the Netherlands
10	Adapting RTOs universities approaches and building collaborations with VET contexts
11	Applied research as a form of experiential learning in VET program curricula
12	Framework for Applied Innovation and Research in VET: Driving Change in Vocational Education
13	AIRinVET Roadmap: Building Research & Innovation in VET Centres
14	Recommendations



Applied Innovation and Research in
Vocational Education and Training

DIGEST 1

APPLIED RESEARCH IN VOCATIONAL EDUCATION AND TRAINING (VET): UNDERSTANDING AND MAPPING

This exploration delves into the multifaceted landscape of Vocational Education and Training (VET) and the complexities of applied research within this domain. The discussion begins by addressing the contentious nature of applied research in VET, emphasizing the need to avoid biased approaches when identifying and defining such research. The adoption of the OECD's definition of applied research sets the foundation for mapping applied research activities within VET.

The concept of VET is elucidated, showcasing it as a mode of education rather than a specific level, encompassing diverse institutions and training modalities. Various factors influencing the analysis of Research and Innovation (R&I) activities within VET, such as different names, duration, training modalities, and management systems, are highlighted. Additionally, the integration of VET into higher education areas and the evolution of multifunctional VET centers emerge as significant trends, presenting opportunities for exploring applied research activities.

The discussion navigates through the historical perspective of applied research, tracing its origins from the science push model to demand-pull and systemic views of innovation. The impact of different models on policies and the shift towards systemic approaches, particularly within Smart Specialisation Strategies

(S3), frames the context for exploring VET's role in innovation ecosystems.

The distinction between "research about VET" and "VET carrying out research" is articulated, emphasizing the interest in non-teaching and learning activities within VET that contribute to innovation ecosystems, particularly focusing on external innovations. The mapping aims to identify applied research activities within VET institutions, aligning with Smart Specialisation Strategies and extending beyond conventional teaching and learning activities.

This investigation aims to discern applied research activities within VET centers that contribute to local, regional, or national innovation systems. By focusing on non-teaching and learning activities with potential impacts on Smart Specialisation Strategies, the study seeks to illuminate the nuanced relationship between VET, applied research and innovation.

Analysis of Applied Research Activities in VET Providers

This analysis focuses on the qualitative research design adopted to investigate vocational education provider organizations' involvement in applied research activities, particularly in collaboration with companies. The study methodology follows a systematic approach termed "LOOK - IDENTIFY - COMPARE."

Research Approach for Mapping

The qualitative research approach employed a case study design involving desk research and interviews. The study aimed to understand how VET institutions approach applied research in terms of activities, collaborations, methodologies, outcomes, resources, and technology adoption. It categorized VET activities into six main categories, focusing notably on Category 5 - Services for companies.

The study further detailed nine dimensions to explore different facets of these activities, leading to the development of the AIRINVET Business Canvas Model.

Target Audience

Initially centered on VET providers, the study expanded its focus to include organizations collaborating with VET providers in applied research activities. Interviews were conducted with a mix of providers and countries to gather comprehensive data.

Findings from the Interviews on Applied Research Activities in VET Providers

The survey conducted by AIRINVET partners between April 2023 and October 2023. The research engaged 79 organizations across 20 countries, conducting 52 semi-structured interviews. The majority were European, covering various education provider types and EQF levels. Interviews revealed differing levels of understanding and engagement in applied research activities across different organizations and countries.

Majority (81%) of respondents identified themselves as education providers, offering various education levels from VET centers, community colleges, universities of applied science to companies providing education (EQF 1 to EQF 8).

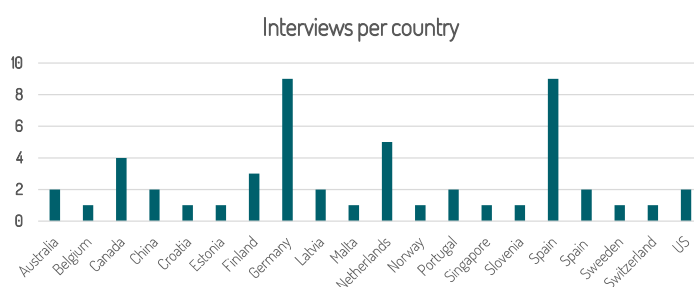
Higher education organizations in Europe, Canada, and Australia systematically organize applied research, whereas many VET organizations in Europe lack a clear understanding and systematic approach to applied research.

The findings emphasized varying degrees of systematic approaches to applied research among higher education institutions compared to non-higher education organizations,

particularly within the European context. The outcomes often focused on educational development, occasionally extending to collaborations serving SMEs, research centers, or specific industry sectors.

Applied research in SMEs often serves educational purposes, with exceptions in collaborations with research centers or public-private partnerships.

Active participants in applied research projects include teachers and students, primarily leading to educational outcomes such as courses, learning materials, prototypes, and reports.



Findings from case studies

The case studies provided insights into various collaborative projects between VET providers and companies, showcasing a wide spectrum of sectors, technologies, and geographical scopes. They highlighted the educational nature of most applied research outcomes, occasionally emphasizing innovation objectives and direct service provision to companies.

Case studies from Canada, Australia, Basque Country, and Germany highlighted direct services offered by VET providers to companies, focusing on learning paths, materials, and methodologies for vocational training education.

Other case studies highlighted partnerships and European-funded projects across various sectors (e.g., agribusiness, healthcare, technology) and topics (e.g., sustainability, cybersecurity), making it challenging to define a specific sector's dominance.

Geographical scopes of case studies were predominantly regional or national, with some international mentions due to the project's or company's international scope.

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DIGEST 2

SUPPORTING APPLIED RESEARCH IN VOCATIONAL EDUCATION AND TRAINING

In an era marked by rapid technological advancements and growing environmental concerns, the VET sector must adapt to the evolving landscape. This adaptation involves incorporating applied research as a crucial tool to enhance VET quality, relevance, and innovation, especially in the context of the green and digital transition. This article examines the support provided for applied research in VET in various European and extra-European countries, studying their policy contexts and funding streams.

The European Union (EU) has been at the forefront of shaping VET policies across its member states, actively endorsing the VET sector through a combination of policy frameworks. The European Skills Agenda and the European Pillar of Social Rights serve as the foundation for these policies, emphasizing equal access to education and the significance of VET.

In addition, four key policies further define the EU's vision. The 2020 Council Recommendation on Vocational Education and Training champions public-private partnerships, accessibility, and the integration of digital & sustainability skills, all aimed at elevating the quality of VET programs and ensuring their alignment with the ever-evolving labor market requirements. Similarly, the Osnabrück Declaration underlines the need to transition towards green and digital economies. The Centers

of Vocational Excellence (CoVE) Initiative complements this framework by promoting innovation, skills development, and applied research within the VET sector, while the European Quality Assurance Reference Framework for Vocational Education and Training (EQAVET) is designed to enhance the quality and transparency of VET across Europe by providing a shared framework that incorporates common principles and indicators. To gain deeper insights into the support for applied research in VET, we now turn to case studies from various European and extra-European nations. The information provided is based on desk research and interviews conducted as part of the AIRinVET project.

Spain and the Basque Country: Spain's policies on applied research in VET emphasize collaboration between VET institutions and the business sector. The Organic Law on the Organization and Integration of Vocational Training and the 2020 Plan for the Modernization of Vocational Training underscore the importance of this partnership. The Basque Country stands out with a unique approach that fosters strong collaborations between VET institutions and local industries, promoting public-private partnerships and encouraging close relationships with businesses. Financial support is derived from a variety of sources, including the Spanish Ministry of Education, Caixa Dualiza, and local government bodies.

In **The Netherlands**, the policy framework mainly rests upon the Agreement on the National Steering Body for Practice-oriented Research (SIA) 2023-2028. Public-private partnerships (e.g., CoVEs) play a pivotal role, encouraging close collaboration between the education and employment sectors. While there is no specific policy mandate for innovation in VET, emerging initiatives like practorates aim to integrate new knowledge and innovations into educational practices, enhancing the quality of VET programs. Despite this progressive policy framework, the unique position of VET centers in the Dutch education system, situated between secondary schools and universities of applied sciences, limits their access to specific innovation structures and grant schemes.

The **German** VET system operates on a shared governance model involving the Federation, Länder (states), and social partners. While Germany lacks a comprehensive framework specifically tailored to applied research in VET, its strong emphasis on dual VET and lifelong learning demonstrates a commitment to developing a skilled and adaptable workforce. Financial support for applied research in VET often begins with federal research and funding by companies is a crucial resource for sustaining and advancing applied research initiatives.

The **Danish** VET system stands out due to its tri-partite governance structure, involving the state, employers, and employees. This collaborative approach is supported by a comprehensive legal framework, national qualifications standards, quality assurance procedures, and financial arrangements.

In **Canada**, the context for applied research in VET primarily centers on teaching and coursework. Faculty members in Canadian colleges typically do not have research as a part of their job description, which drives institutions to offer “buyout” agreements, allowing faculty members to engage in research activities. Funding remains a challenge since the structures vary and universities are often allocated the majority (97%) of federal research funding over colleges (3%). Core funding primarily comes from the colleges themselves, supplemented by operating grants and private funding, including fee-for-service arrangements.

The **Australian** policy context presents unique challenges, including the absence of a structured research framework for VET and insufficient time allocation for VET teachers engaged in research. The financial landscape for applied research in VET is shaped by limited financial support, administrative challenges, and the pivotal role of partnerships in achieving successful research outcomes. Similar to Canada, VET typically receives a lower share of research grants compared to the higher education sector, making it reliant on industry and corporate funding. This reliance underscores the ongoing need for strong partnerships between VET institutions and industry. Collaborative projects are negotiated case by case, lacking standardized agreements, payment structures, and operational frameworks.

Applied research is an indispensable component in the evolution of VET to meet the demands of the rapidly advancing green and digital economy. The European Union has played a pioneering role in this endeavor through ambitious policies that emphasize inclusivity, sustainability, and public-private partnerships. Nonetheless, challenges persist, particularly concerning financial sustainability and streamlined funding frameworks, which is why collaboration between VET institutions and the industrial sector remains in many cases vital to ensure sustainable funding. Policymakers, educational institutions, and industry leaders are key players in driving this transformation, ensuring that VET remains at the forefront of developing a skilled, adaptable, and future-ready workforce. As industries continue to evolve, VET, with applied research at its core, will continue to be a cornerstone of societal progress, responding to the ever-changing needs of industries, societies, and learners.





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DIGEST 3

APPLIED RESEARCH INITIATIVES IN MANUFACTURING, URBAN GREENING, AND DIGITALIZATION

This case studies from the Basque Country, the Netherlands and Germany showcase applied research and practical implementations, addressing unique challenges within manufacturing, urban greening, and digitalization, offering solutions and disseminating knowledge to stakeholders and the wider community.

Armeria Eskola focuses on machine-to-machine communication for “Zero Defects” in manufacturing, achieved through workshops and training sessions.

Yuverta’s Practorate aims to prepare for climate-proof urban areas by bridging practice, research, and education, exemplified by the Diopsis insect camera test.

Orange GmbH’s Diginet.Air supports SMEs in digital transformation in the aviation sector by implementing innovative training systems.

More case studies available at <https://airinvet.eu/outcomes/>

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Organisation	Armeria Eskola	
Type of organisation	VET centre / University of Applied Science/...	
Region/County/Municipality	Eibar, Basque Country	
Name of initiative	INTELLIGENT MANUFACTURING CELL	
"Sector (Manufacturing, energy, healthcare, agriculture)"	Manufacturing	
Short description of the initiative	VERIFICATION BY MEANS OF OPTICAL SYSTEMS AUTOMATIC COMPENSATION ON THE MACHINE TOOL ITSELF	
Geographical scope	Regional, Basque country	
Public info:	Web SARIKI	
Participants	Teachers	
Funding	Public	SMEs funding

Initiative

This project is based on the communication and automatic compensation between 2 machines. Specifically, between a CNC Lathe with Fanuc 32i control and a Vici Vision Machine. The measuring machine measures the part and automatically sends to the production machine the corrections to be made if the part is out of tolerance. Possibility of generating an intelligent cell, since the compensation between the measuring machine and the production machine is automatic.

Generating an intelligent Manufacturing Cell since there is communication and automatic compensation between 2 machines, with the purpose of producing "Zero Defects".

Achievements

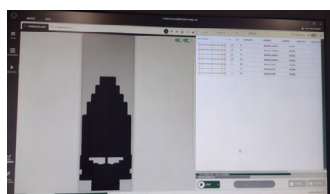
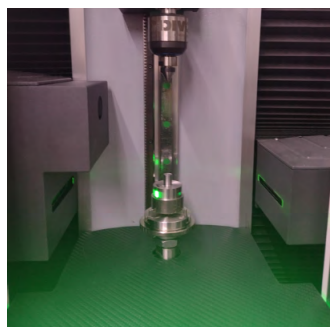
- Communication between production and measuring machines
- Communication for FANUC 32i control.
- Automatic compensation of dimensional errors automatically between measuring machine and production machine
- Compensation and communication between machines is possible, opening a very interesting and wide field to generate several possibilities (INTELLIGENT CELLS robotizing both machines, automatic process control with the aim of making "ZERO DEFECTS" key points in the context of industry 4.0.

Results assessment

- Machine-to-machine communication achieved once the two machines have been parameterized.
- Automatic compensation performed, correcting the part errors automatically.

Transfer of knowledge

- Workshop held at the Armeria Eskola on 19/05/2023 (companies / centres)
- Training of the project to the group of the Metrology Specialization, of the Armeria Eskola.
- Dissemination:
 - [Web SARIKI \(full day video\)](#)
 - [Web Armeria Eskola](#)
 - [LINKEDIN](#)
 - [INSTAGRAM](#)



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Núm	X	Z	R	T	RELATIV		
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W 002	0.0957	0.0000	0.0000	3	Z	86.2336	
W 003	0.0000	0.0000	0.0000	7		0.0000	
W 004	0.0000	0.0000	0.0000	3			
W 005	0.0000	0.0000	0.0000	2			

Organisation	Yuverta
Type of organisation	VET provider
Region/County/Municipality	Netherlands
Name of initiative	Practorate Green Liveable Cities
"Sector (Manufacturing, energy, healthcare, agriculture)"	Urban Greening
Short description of the initiative	Climate change, increasing urbanisation and biodiversity decline call for a different design of urban areas. There will be more focus on green, blue, biodiversity and circularity. As a result, there is a different demand on the green labour market. The Practorate Green Liveable City responds to this changing green labour market and aims to prepare students, teachers and professionals for these developments. The unit consists of Heidi Kamerling and three teacher-researchers.
Geographical scope	Central part of the Netherlands
Public info:	https://www.groenehotspothouten.nl/leren/practoraat-groene-leefbare-stad and https://www.practoraten.nl/practoraten/groene-leefbare-stad/

Initiative

Testing of the Diopsis insect camera in practice. Methodology

Achievements

The Diopsis Insect camera is developed by knowledge institute Naturalis. This instrument automatically takes pictures of insects, to measure biodiversity, and automatically sends the image to an online database. At the Green Hotspot of VET college Yuverta, the practor Heidi Kamerling is testing this instrument in practice, together with VET students and teachers, to see how the instrument works in practice and checking the results with manual biodiversity measurement methods.

Result assessment

The results of the instrument are being checked by students, to see if the results are being determined correctly.

The project monitors the practical implications and constraints of the instrument, such as: how do you prevent the instrument being stolen, how to implement it without disturbing the environment

Transfer of knowledge

The results of the applied research are being shared with the developer of the instrument, as well as with all landscaping companies connected to the Green Hotspot, so they can use it in their daily work.

This case study belongs to the Practorate Green Liveable City. This practorate is embedded in the Green Hotspot Houten, a public private partnership in VET on landscaping and urban greening.



<https://www.groenehotspothouten.nl/projecten/monitoring-vegetatie-en-insecten-houten>

Organisation	Orange GmbH		
Type of organisation	Company		
Region/County/Municipality	Germany Hamburg Bremen		
Name of initiative	Dignet.Air		
"Sector (Manufacturing, energy, healthcare, agriculture)"	Engineering and CAD Manufacturing		
Short description of the initiative	Digitalisation of SME		
Geographical scope	Metropolregion Hamburg		
Public info:	https://orange-engineering.de		
Participants	Researchers	Company trainers	Employees
Funding	Public	Own funding of company	Own funding of company

Initiative

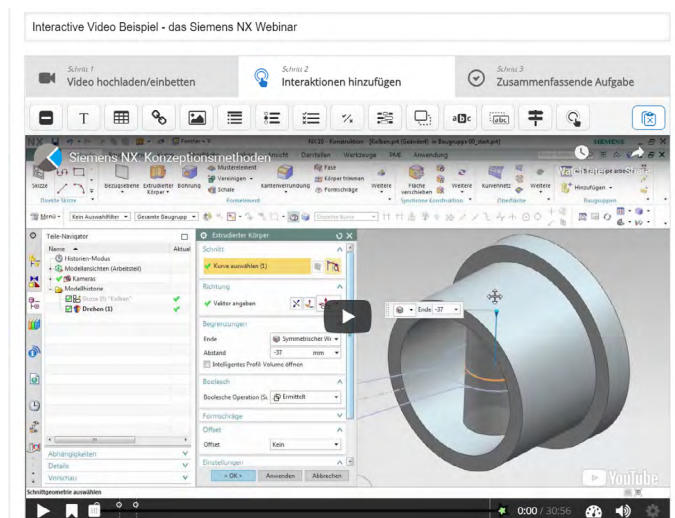
The project "DigiNet.Air – Digital Learning Network in the Aviation Industry of the Hamburg Metropolitan Region" aims to support and accompany small and medium-sized companies in digital structural change. To this end, DigiNet.Air develops low-threshold and project-like formats that are directly geared to operational issues and are intended to support small and medium-sized enterprises (SMEs) in dealing with Industry 4.0 and Work 4.0 topics.

In this case study a process analysis was carried out at the Bremen location of Orange Engineering. The aim was to find out whether the desired target state of making the training of new employees faster and more efficient can be achieved with the H5P technology. For this purpose, H5P was presented and this solution approach was discussed together.

Methodology and results

The research methods were Work Process Analysis and Competence Profiling.

- Analysing actual status
- Defining new status together Identification of training needs
- Solution: H5P-Videos
- Technical guidance and training
- Implementation at work environment
- Results
 - Achievements: a new digitalized training System with interactive technology H5P for the training of new employees,
 - Results assessment
 - Transfer of knowledge



DIGEST 4

DO WE NEED A GLOSSARY?

The different terminology used when talking about Vocational Education and the applied innovation and research (AIR) activities these providers engage in, could lead to misunderstandings and discussion. In the process of mapping the AIR related activities carried out by Vocational Education providers, the first step was to create a common understanding of the terms we use for defining these activities. The AIRinVET glossary is a document created to establish a shared common understanding of the terms used. It aims to facilitate comparison and understanding between organisations.

For the definitions, whenever it was possible, we followed official sources. We followed OECD's standards for most of the terms related to Research and Innovation (R&I), and Cedefop for the terms related to VET. When neither gave an answer, we looked at other sources or propose a definition ourselves. We decided to use existing sources and avoided proposing definitions of our own because we are aware that we are not inventing new words but exploring the potential of extending their use to VET. In addition, we aim to engage with other international organizations and projects, so we try to move away from terms that can only be understood in the small circle of the partners of our project.

Our glossary aims at defining:

- The actors that can be involved in an innovation system: for instance, VET centres, Higher VET centres, Universities, Enterprises, SMEs, Clusters, Research organisations.

- The main R&I type of activities: basic research, applied research, experimental development, production, commercialization, innovation, or other.
- The main methods for conducting research: quantitative research, qualitative research, experimental research, or other.
- The main type of activities conducted in R&I: focus group meetings, prototyping, design, questionnaires, and so on.
- The main results of the activities: papers, books, prototypes, products, services, patents, and others.

The glossary is structured in two parts:

- brief historical reflection about science, applied science, technology, research, innovation, and other terms that wishes to explain two things:
 - Where the terms come from and why it might be worth defining them.
 - The changing nature of things.
- The glossary with the definitions of the main terms of the taxonomy. The terms are displayed in alphabetical order and for each term we provide:
 - Its definition.
 - The source of the definition.

Now it is ready for you to consult it! Access the [document](#) or the [online glossary](#)!

DIGEST 5

EXAMPLES OF APPLIED RESEARCH BY VET CENTRES IN THE EU

An example on Applied Research Approaches in VET Organizations in Germany, Basque Country and the Netherlands.

These organizations display diverse approaches in their value propositions, research methodologies, outputs, resources, funding models, stakeholder engagements, and contextual influences within the VET sector, catering to different educational levels and industry needs.

Regarding applied research activities we could summarize them as follows:

- **Institute of Technical Education and University Didactics (ITBH)** focuses on technology-work-education relationships, conducting research within a university context.
- **CIFP Armeria Eskola LHII** emphasizes innovation projects, competence recognition, and varied research methods across educational levels.
- **Drenthe College** specializes in hydrogen-related research, addressing industry demands in the evolving Hydrogen Valley.

Here is the three organisation's contextual approach:

- **Institute of Technical Education and University Didactics (ITBH), Germany**

Education Level Offered: EQF 3 to 6

- Value Proposition: Focuses on analyzing technology-work-education relationships, divided into three key fields: Qualification research, technology analysis, and teaching-learning concepts.
- Research Methods: Includes sector and work process analysis, competence profiling, and design-based research.
- Outputs & Assessment: Produces scientific reports, theses, guidelines, and teaching concepts.
- Resources: Engages around 10 researchers in vocational and applied research.
- Context & Policies: Operates within a university context, funded by the state of Hamburg and German ministries, companies, and associations.
- Engagement of Stakeholders: Collaborates with entities like H00U, SDG Campus Hamburg, and Digitallearninglab Hamburg.

- **CIFP Armeria Eskola LHII, Basque Country**

Education Level Offered: EQF 4 and 5

- Value Proposition: Engages in innovation projects with companies focused on Industry 4.0, enhancing competence recognition for professionals.
- Research Methods: Varies based on activities, from theoretical conclusions to practical solutions using a defined four-step methodology.
- Outputs & Assessment: Focuses on transfer to students, companies, and teachers, with evaluations and satisfaction surveys.
- Resources: Utilizes expert staff, machines, workshops, labs, and software to fulfill project needs.
- Context & Policies: Complies with local, national, and European education and research guidelines.
- Funding & Revenue Streams: Relies on public funding from governments, councils, and companies for service and educational innovation projects.
- Engagement of Stakeholders: Collaborates with SMEs, research centers, and universities.

- **VET: Drenthe College, the Netherlands**

Education Level Offered: VET

- Value Proposition: Focuses on hydrogen in the energy transition, unique practicum in the Netherlands, aiming to fulfil industry demands in a growing sector.
- Research Methods: Employs various methods like data gathering, desk research, prototyping, hackathons, etc., in cooperation with the industry.
- Outputs & Assessment: Emphasizes applied innovations usable for industry and contribution to the green transition.
- Resources: Engages in good communication and shared interests with industry stakeholders, leveraging a large-scale project in the Netherlands.
- Context & Policies: Associated with the Hydrogen Valley development in Groningen and Drenthe, supported by significant investment.
- Funding & Revenue Streams: Receives funding from the €10 billion investment plan for the Hydrogen Valley.
- Engagement of Stakeholders: Actively collaborates with SMEs, with shared funding and co-financed business projects.

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DIGEST 6

APPLIED RESEARCH ENGAGEMENT AND MINDSETS

D3.2 SMEs ENGAGEMENT & AR MINDSETS REPORT discusses the current landscape of research and innovation (R&I) from the perspectives of both Vocational Education and Training (VET) and Small to Medium-sized Enterprises (SMEs). Insights are drawn from desk research, quantitative surveys, and qualitative interviews. Key elements and barriers when engaging in innovation and non-teaching, knowledge generation or diffusion activities are identified and practical tools and training materials are proposed to foster an R&I research mindset.

SMEs' engagement in applied innovation and research activities

SMEs represent 99.8% of the companies in the European Union (EU) and are the lifeblood of the EU economy. They are currently facing major challenges and crises, such as labour shortages, automation and digitalisation, rising costs for raw materials, rising inflation, supply chain disruptions and skills mismatch to name a few. To meet these challenges, SMEs must innovate. Desk research underlines that SMEs investing in research and development benefit from increased growth, value, and sustainability. However, our investigation shows that R&I is not common among SMEs. R&I projects are expensive and require investments in terms of time, personnel, and money. Also, desk research and surveys show that SMEs know little about VET centres and are unaware of the possibilities of collaboration with the vocational education sector. They perceive cultural differences between the two structures as barriers and think it is difficult to find suitable educational institutions.

Our investigation provides insights into SMEs' expectations in terms of R&I projects with VET centres. They are interested in exchanging knowledge, networking, accessing specialised knowledge and expertise, as well as enhancing their reputation and visibility in the industry and among future employees.

A decision tree delineating various collaboration options between VET centres and SMEs was developed from the perspective of SMEs. It considers two main factors: the time and available resources of the SMEs and their motivation to engage in innovation projects. SMEs are advised on the form of collaboration activities to adopt according to their capabilities and can be inspired by concrete examples. The decision tree features 21 different forms of collaboration between VET organisations and SMEs.

VET centres' engagement in applied innovation and research activities

VET systems and policies vary widely from country to country. R&I activities by VET centres have grown in the past years but remain a secondary activity. Out of the 40 VET centres surveyed, only 44,74% provide applied research and development projects to companies. The results of the interviews, the surveys and desk research show that VET centres lack the resources and visibility to engage in R&I activities with companies.

Lack of resources:

- VET centres have difficulty attracting qualified personnel and getting their staff on board with R&I projects. Research is often not fully integrated into VET teachers' curricula, and they lack the time to devote to R&I projects. The heavy administrative burden also requires investment in terms of personnel. Time constraints and heavy workload are considered the main barriers to R&I activities by VET centres surveyed. The insufficient faculty expertise in research and innovation is also rated as an obstacle to their involvement in such projects.
- R&I activities require substantial financial investments that VET centres cannot afford on their own. They lack funding to engage in R&I projects. Most funding schemes are dedicated to higher education institutions, and the grants available to VET centres do not always cover all occurred costs. Funding tends to be ad hoc, whereas R&I projects are a long-term commitment. There is a lack of awareness of the funding options. More than half of the VET centres surveyed perceive the lack of funding and resources as a significant barrier.

Lack of visibility: VET centres are rarely seen as partners by other stakeholders and their value in R&I activities tends to be underestimated. They are overshadowed by higher education institutions that are considered the main research partners.

Difficulties in attracting companies: The lack of visibility for VET centres makes it difficult to attract SMEs. Companies have a different culture from VET centres and tend to be cautious about protecting their data. The financial side generally outweighs the fundamental value of projects. The cultural differences between education institutions and industry are nonetheless considered moderate barriers by VET centres surveyed (rated 3.6 out of 5).

VET centres see many advantages in collaborating with SMEs on R&I projects. For VET centres surveyed, it is above all an opportunity for knowledge exchange and networking (rated 4.44 out of 5). They believe that companies can give them access to specialised knowledge/expertise, funding or grants for collaborative projects (rated 4.25 out of 5) and equipment (rated 4.06 out of 5). The interviewees largely highlighted the benefits of collaboration with SMEs on R&I projects, which are valuable for all.

A training for VET teachers was developed and piloted in Hamburg from 23rd to 25th January 2024 to provide VET teachers and managers with tools to engage with SMEs in R&I projects. 12 VET teachers from various European countries participated in the training. They were invited to map the stakeholders within their innovation systems and to highlight existing collaborations and potential gaps in the network. The participants gained practical insights and skills for fostering successful collaborations between VET centres and SMEs. The training was received positively by the participants, who found great value in observing how R&I is conducted in VET across different countries.

Recommendations & good practices

A series of recommendations and good practices for three main target groups were developed: the management teams at VET centres, the teachers and staff of VET centres and the SME management and staff.

For the management teams at VET centres: Workshops and training sessions, such as the one in Hamburg, should be designed for management teams at VET centres to promote the benefits and good practices in R&I projects. Networking should be fostered through international exchanges and forums. Management teams at VET centres should be supported in the demand and resource identification, as well as in strategic planning. At the methodological level, key performance indicators should be established to assess the impact of the projects.

For teachers and staff of VET centres: A research and innovation culture should be established, involving teachers, staff, and students, and allocating them the necessary time and resources. The teachers and staff of VET centres should be offered professional development opportunities and be part of a research community. They need support in the search for grants and the knowledge transfer to students. They should be recognised and rewarded for their involvement in R&I projects.

For SME management and staff: Workshops and webinars should be developed to promote applied research projects with VET centres to SMEs. They should have access to a database classifying available research grants and funding opportunities and to an online platform listing research guides, case studies, and best practices in R&I.

SMEs and VET centres have overall the same conception of R&I projects and would both benefit from collaboration. They must be made aware of the opportunities for cooperation on such projects. Networking events gathering all R&I stakeholders should be organised to build trust and facilitate collaboration and knowledge sharing. R&I projects should be enhanced as investments with long-term benefits.

Besides the report, six engagement videos directed at VET centres and SMEs and targeted to the regional audiences of the Basque country, the Netherlands and Germany, have been produced. They can be viewed on the project website: www.airinvet.eu/outcomes.



DIGEST 7

INTERVENTION 1: APPLIED RESEARCH IN VET IN THE BASQUE COUNTRY

This digest collects and describes the first of five interventions showcasing the regional context of collaboration between VET organisations and the local ecosystem. In this summary we include the experiences and a list of recommendations and key elements for VET centres when implementing action to enhance AR activities to consider in their interventions.

The intervention aimed to promote Basque VET system's applied research practices to international audiences. It covered policy insights, examples of collaboration between companies and VET centres, and reflections on the role of policy makers. The session utilized lecture-based learning and multimedia case studies.

Key Points:

1. **Audience:** The training was open to individuals interested in applied research in VET, including educators, researchers, and industry representatives. Participants included project partners from various countries.
2. **Training Objectives:** Participants learned about Basque VET's applied research framework, collaboration examples, and the role of stakeholders. Learning objectives included understanding the applied research process, recognizing examples and methods, reflecting on educator roles, and inferring system applications.
3. **Content Details:** The training consisted of five blocks covering policy discussions, Basque business overview, SME perspectives, VET centre roles, and identifying development gaps.
4. **Learning Outcomes:** By the end of the session, participants were expected to identify and describe Basque VET's applied research process, recognize examples and methods, reflect on educator roles and SME applications, and infer system applications.

Overall, the intervention aimed to share Basque VET's applied research experiences, provide insights for international audiences, and facilitate knowledge exchange and collaboration among stakeholders in the field.

The goal of this projects with small and medium-sized companies is to develop applied innovation projects with companies to respond to the requirement to bring the teaching staff up to date in terms of science and technology, promoting innovation both in SMEs and in vocational training centres.

During the final block of the intervention, participants applied their learning outcomes by planning the implementation of the TKgune programme in their respective regions. They utilized a questionnaire to identify gaps and challenges in developing TKgune in their countries. The intervention was informed by the work done in the AIRinVET project, particularly focusing on the TKgune programme's ecosystem and its comparison with European and Canadian contexts regarding applied research. Insights were drawn from various stakeholders, including policy makers, program coordinators, SMEs, and teachers.

Qualitative indicators highlighted areas for improvement in the vocational training landscape across different countries, such as enhancing industry collaboration, updating skill development programs, promoting apprenticeship programs, establishing research and innovation hubs, and engaging with the local community for feedback. Recommendations were made to enhance collaboration across borders, integrate advanced research methods, increase funding and support, and standardize innovation practices within vocational training centres. Implementing these recommendations would contribute to building a robust, innovative, and responsive vocational training ecosystem in Europe and regional markets.

You can watch the session at the [AIRINVET channel](#)

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DIGEST 8

INTERVENTION 4: ENHANCE LEARNERS CURRICULUM - APPLICATION OF WORK PROCESS ANALYSIS (WPA) FOR SME'S IN HOUSE TRAININGS

Situation

Today's working world is changing, particularly in terms of Industry 4.0 and agile working methods. Work processes are becoming increasingly complex and are no longer fully understood by employees. At the same time, the demands are increasing for companies that want to implement technical innovations and as a result have to design changing requirements for work processes and professions.

Problem

The problem is: an increasing number of processes in the modern working world can be described as a black box. Employees do not fully understand these processes, which at the same time affects the way they are doing their work-activities. The increasing complexity (among others, related to digitalisation), require upskilling by vocational training for targeted qualification. To understand which skills should be included in this targeted vocational training, analysis of the new work reality is needed.

Solution

The basis for starting Work Process Analysis in small and medium-sized companies (SMEs) is the identification of a need for action in the context of digital structural change or other changes. Making processes visible creates the basis for action in order to be able to convey professional knowledge in a targeted manner. To structure the analysis, the Work Process Analysis follows a path containing four steps: first, a work process must be identified. Second, a description of the work process is carried out. Third, the skills required for the work process are identified and compared with the skills the worker already has. Fourth and finally, a training module is developed and implemented that qualifies employees for the new work process.

Key points

- The analysis of today's work processes has become one of the main topics in work place innovation.
- A training for Work Process Analysis should contain the following topics: Understanding of the concept of work processes and work process analysis, spheres of actions, competence profiles and the general holistic structure of vocations.
- Enhancing of learners/ employee's know-how by SME-in-house-trainings will bring best-practice outcome.
- The provided trainings should be created as small-scale training modules for tailor-made qualifications.

Outcome of the intervention

As part of the AIRinVET project, BHH shared the Work Place Analysis and competence profiling approach with the whole consortium. After the theoretical introduction of approaches, they were heavily assessed and discussed by all the partners of the AIRinVET project, related to their own context. The next step is that the attendees start using these approaches by include them in their own regional context, for the development of applied and innovation services provided by VET institutions. In this way, SMEs in their region can get the value out of applied and innovation research offered to them by VET.

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Applied Innovation and Research in
Vocational Education and Training

DIGEST 09

BRINGING THE PUBLIC PRIVATE PARTNERSHIPS APPROACH FURTHER

Bringing the Public Private Partnerships approach further

In our series of interventions, we are sharing and enriching existing approaches to make them useful for the introduction and uptake of applied and innovation research in vocational education and training institutes. The Dutch contribution to these series is an interactive training about the Public Private Partnership (PPP)-approach, enriched with the earlier experiences from our AIRinVET-project. This approach, developed in The Netherlands by Katapult over the last 10 years, was presented by Katapult and ISSO and assessed by other partners on usefulness and feasibility in their own context.

In this digest, we first present in brief the presentations about PPP, followed by the feedback from the assessments. We conclude with a next step in the development of the PPP-approach and some key insights that are useful for a EU-wide uptake of the PPP-approach to foster the uptake of applied and innovation research by VET institutions.

The PPP approach

Key in the PPP-approach of Katapult is the collaboration between government, education and industry, each with their own role. PPP's are mostly set up in a specific region and always related to a specific topic, such as H2-transition, advanced manufacturing, IT security, mental health for refugees or sustainable energy for buildings. Aim of the PPPs is to solve real life problems by combined forces to make next steps in the specific field by doing applied research.

The training

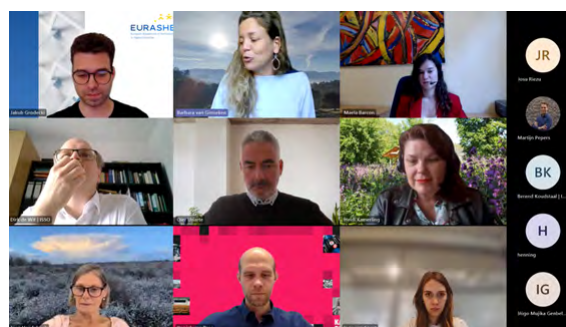
The first day started with an introduction on how to establish a PPP, presented by Yorrick van Bree of Katapult. This presentation, under the title “PPP Approach in the NL: PPPs and Applied Research” consisted of a general introduction in the PPP approach and the models and tools used to guide the development of a PPP. These tools cover all topics that needs attention (see also the circle diagram). A successful PPP needs a good network, good internal communication, good practical activities and good exchange of ideas within the consortium and to others, all guided by good leadership. Yorrick concluded with insights on how the approach is used in other contexts, such as the Community of Practice for Centres of Vocational Excellence (CoPCoves).



Credits: Katapult

To go from theory to practice, the next session was presented by Heidi Kamerling, practor Green and Liveable cities at Yuverta under the title: “Doing Applied Research: Cooperation within a PPP from the VET Perspective”. A key point in her work is making to connection between research and VET and the daily life practice, and to use this research to create curiosity to the world around us. She underlines our earlier finding that we need to be careful with calling our activities research, because research is recognised by different stakeholder groups as something from universities and therefore from outsides their world. She stated that based on her practice it is not about the money, but about a clear broad-based ‘why’ to start a successful PPP. This means also that you need to be aware of the expertise within the PPP you want to establish and that you build the PPP in a way it connects to the needs of the companies you want to collaborate with.

Nevertheless, funding is important as a supporting mean to reach the goals based on the why of the PPP. Therefore, the third part of the intervention was about “Funding Applied and Innovation research withing PPPs: what is important in The Netherlands”, presented by Martijn Pepers (Katapult). In the Netherlands, the common life span of PPPs is four years. This gives time to build a strong collaboration and strong results that are integrated in the daily work life. When in contact with governments to establish proper funding instruments, it is important to underline that in the long run everyone gets an advantage, although it is not good appointable to one group. This means that especially for sustainable and longer lasting PPPs funding should come also from a government or other external source.

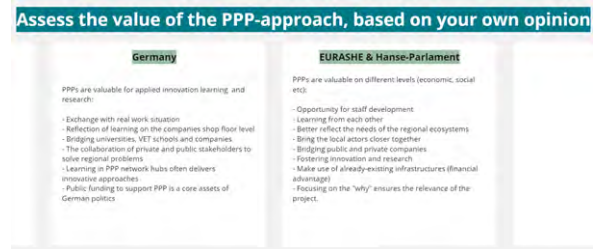


Credits: AIRinVET

Assessing the possibilities of PPPs in other contexts

Based on the presentations about PPPs in the Netherlands, the AIRinVET partners from the other countries assessed the possibilities of setting up PPP's in their own context and to make a presentation with the results for the second day. To guide them, Dirk de Wit (ISSO) prepared the following points to assess and created a Miro-board for them:

- The value of the PPP-approach, based on your own opinion.
- The possibilities of setting up PPPs (the scalability) in your context.
- Supporting and constraining structures, policies etc.
- Needed adaptations of the ecosystem to make the PPPs possible (if any).
- How to handle or denying structures, policies etc. and other constrains.
- Supporting structures, legislation etc. that are not in place in the Netherlands (based on what we have presented).



Credits: AIRinVET

Results of the assessments

The second day started with the presentation of the assessments done by the other regions in AIRinVET: The Basque Country (Spain), Germany and Europe as a whole.

The Basque Country

The assessment for the Basque country was done by TKNIKA, IMH and AFM. Although in the Basque country there is a good environment to work with the PPP approach, two main constraints are identified:

1. **Bureaucracy:** Public procurement policies and strict regulations can hinder the agile implementation of PPP projects. The idea to solve this, is by making the regulations more flexible and remove unnecessary legislation. Also implementing good financial incentives and other regulations, established from an innovation point of view and based on the insights of all needed stakeholders, can help. Most ideal is to have a specific legal framework for PPPs, just as in the Netherlands.
2. **Technical Capacity:** A lack of technical capacity in certain areas may limit the potential of PPPs. This can be solved by strengthening the collaboration and the needed infrastructure between public and private sectors and VET Schools. This collaboration can be extended to international collaboration.

An interesting needed adaptation addressed by the partners from the Basque Country is the request for training of public officials and private partners in the management and coordination of PPP projects.

Germany

The assessment for Germany was done by BHH. They see the PPPs as a valuable mean for innovation due to the relation with the real life situation, learning on the shop floor level and the collaboration between universities, VET schools, companies and both public and private stakeholders. This collaboration stimulates innovation.

Even though the funding of PPPs is well organised, setting up a good PPP is hard because establishing a good and diverse network is difficult. Existing ways of collaboration and their funding don't support long lasting collaboration projects. Also funding regulations can be very strict and not supportive.

To overcome the barriers, a mind shift is proposed: cooperation and collaboration needs to be seen as base for innovation and the results should no longer be calculated with down to earth financial instruments like the ROI of projects themselves. To strengthen the collaboration and cooperation between all stakeholders, effort is needed on good marketing and presence in different areas (Universities, Schools, chambers, companies etc.) to promote the high quality and results out of PPPs.

Do something good and talk about it!

European perspective

EURASHE and Hanse-Parlament have done the assessment from a European Perspective. They were able to perform the assessment in this way, because they have a clear overview of the Higher education and industries in Europe.

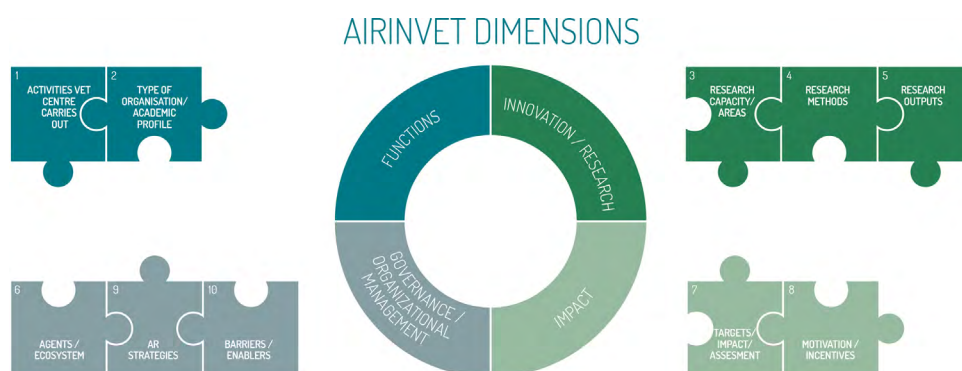
In general, PPPs are very valuable, on different levels. Think about staff development, knowledge exchange and collaboration, bridging public and private companies together and fostering innovation and research. To get this value, focus on the 'why' of the project. For a further uptake of the PPP approach might the lack of awareness about these values be a problem.

As also mentioned in the German assessment, finding good partners can be hard. From a company perspective is intellectual property a main concern, for all partners can the administrative burden be a reason to not participate in PPPs.

To stimulate setting up PPPs a supporting organisation like Katapult is very important, both to establish a PPP culture and to connect the stakeholders. Another need is to have implemented regulations that support the PPPs, when needed on different levels (National, Regional, Local). These supporting regulations should be actively communicated. A third need is to raise the awareness about the value of PPP among stakeholders.

Further development of the PPP-approach

The AIRinVET project runs now for about one and a half year. Based on the insights gathered, Barbara van Ginneken (Katapult) presented a redesign of the PPP dimensions to make it more suitable for the aim of AIRinVET: to use the PPP approach as a mean to stimulate the uptake of Applied and Innovation Research by VET Institutions. This is done by redescribing the dimensions focussed on R&I activities in PPPs, so VET Institutions know where they have to focus on when they start doing R&I activities together with other stakeholders. To foster the uptake, it is of high value that there are places for VET Centres to get the needed knowledge and to share experiences to learn from each other, such as the COPCoves.



Have a clear and broad based why for your PPP.

To conclude this brief overview of the intervention about the PPP-approach, five important insights:

1. Have a clear and broad based 'why' for the establishment of your PPP. What is the motivation? Intended impact?
2. Create awareness of the value of PPPs and about the realised results for all relevant stakeholders. Use this to build broad networks of relevant stakeholders.
3. Funding and legislation should be supportive for longer lasting PPPs with stakeholders from different groups and entities.
4. Have a supporting organisation in place in your context.
5. Offer education to staff of the VET centres on how to set up and run PPPs.

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DIGEST 10

EURASHE INTERVENTION ON THE 7TH OF MAY

On the 7th of May, during the International Staff Training Week in Vilnius, organized by EURASHE and VIKO (Vilniaus Kolegija), the project consortium and members of the EURASHE research community of practice had a chance to meet and learn from each other. During the week-long meeting, parts of the session were dedicated to the intervention within the AIRinVET project focused on accelerating applied research, experimental development, and innovation to enhance regional impact effectively by adapting RTOs/ universities approaches and building collaborations with VET contexts. This event gathered a predominantly academic audience from the University of Applied Sciences and members of the AIRinVET consortium, fostering a profound understanding of the mutual benefits stemming from collaborations between universities and vocational education and training (VET) centers.

The sessions explored various critical aspects:

- The significance of engaging applied higher education institutions (HEIs) in research activities to boost educational and regional development.
- Essential competencies for researchers, emphasising practical skills for navigating complex research environments.
- Future perspectives and evolving demands in the research sector, particularly regarding local and regional impacts of research.

Participants showed keen interest in the RECAPHE tool, a pivotal resource for self-assessing research competencies. This tool is instrumental in:

- Screening research, development, and innovation (RDI) activities across European professional higher education institutions.
- Developing staff competence profiles for RDI, clarifying the competencies required for effective applied research and innovation.
- Creating targeted training materials and a structured curriculum for PHE research and innovation professionals, including modular online micro-learning units designed to enhance specific competencies.

Furthermore, the [RECAPHE](#) project compiles significant insights and policy recommendations into a comprehensive report. This report outlines the structured list of RDI skills and provides a concise description of the RECAPHE course modules, offering strategic guidance on strengthening the distinct profile of RDI research at institutional, regional, national, and European levels.

In conclusion, professional higher education institutions (PHE) play an increasingly important role in enhancing European competitiveness and innovation capacity, especially at the regional level, where PHE institutions act as connectors and crucial links between regional SMEs, regional organisations, and society. In addition, applied research activities have an important role in developing students' skills including their innovative thinking and entrepreneurship and contribute thus to further economic growth and jobs within the regions.

Due to their practice-oriented approach and specific characteristics, applied RDI and regional activities often do not fit the same metric as the research and innovation activities done at the more traditional universities. Therefore, there is a need to support further development and enhancement of the PHE institution staff's capacity to engage in applied research activities, link these to teaching, and develop relevant ways to engage students and staff in these activities.

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Applied Innovation and Research in
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DIGEST 11

APPLIED RESEARCH AS A FORM OF EXPERIENTIAL LEARNING IN VET PROGRAM CURRICULA

This digest describes the last of five interventions in the AIRinVET project which explored one Canadian college's experience and provided recommendations for VET institutions with an interest in engaging students in applied research. The New Brunswick Community College (NBCC) approach is based on proven practices shared by other Canadian colleges. These practices were adapted for NBCC's environment over the course of ten years and helped them develop a research culture through a structured educational framework of experiential education. NBCC is now known for its success in engaging students in applied research. Intervention five extrapolated two frameworks, experiential learning and core employability competencies, from NBCC to other VET providers.

Canadian colleges engage in applied research to develop the talent employers need and provide the expertise required to develop or improve products, processes and services and enhance their partners' competitiveness, efficiency and sustainability. The Canadian applied research system in VET is at the forefront in this field. In the 2019-20 year, Colleges and Institutes Canada (CICan) reported the following:

- 8,000 research partnerships, the vast majority of them with SMEs;
- 42,000 students engaged in applied research activities as work-integrated learning (WIL); and
- over 5,500 new processes, products, prototypes and services, 85% of which were completed in under one year.

The intervention involved the facilitation of two online workshops. The lead of this intervention demonstrated to partners and others how to enhance the learning experience for students while also contributing to the socio-economic growth of their regions through frameworks for experiential learning and core employability competencies integrated into program curriculum. The intervention explored how core employability competencies and experiential learning can prepare learners for the future of work and how VET institutions can ensure effective integration of applied research in their educational programs.

Workshop 1: Applied Research and Experiential Learning began with an overview of how one Canadian college successfully integrated applied research as a form of experiential learning in program curriculum, while also drawing from the experiences of other Canadian colleges. It highlighted how student engagement in applied research develops professional, employability skills while also providing opportunities to practice technical skills. The frameworks were explained, with a focus on teaching and learning implications. Success factors for implementation were also discussed. This workshop was intended to appeal to VET leaders, project partners and others who were interested in enhancing the learning experiences for students while also serving the socio-economic needs of local companies and communities.

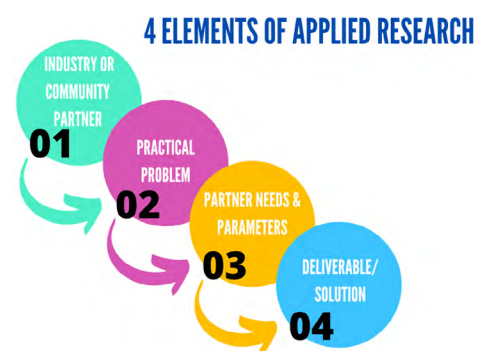
Workshop 2: Integrating Applied Research in Program Curriculum was an interactive session intended for VET instructors and curriculum developers. In this session, specific examples and tactics were shared on how to improve teaching practices and enhance student learning through the integration of applied research and program curriculum. The purpose of the second session was to equip participants with ideas and actions that could be implemented in their VET programs. Participants brought a course outline or syllabus to use in the workshop and they were invited to complete an optional post-program assignment.

Learning Outcomes

By the end of the two sessions, participants were expected to:

- Discuss the benefits of experiential learning and employability competencies for TVET students
- Explain how applied research is a form of experiential learning and work-integrated learning
- Recognize how engaging in applied research develops employability competencies and professional skills
- Describe the key components for successful integration of applied research in program curriculum
- Translate the framework and components to their institutional contexts
- Identify a potential applied research project that would meet expected course outcomes
- Demonstrate how applied research as a form of experiential learning can be integrated in a course or program
- Design an applied research project with an industry or community partner that is aligned with course content and meets course outcomes (optional)

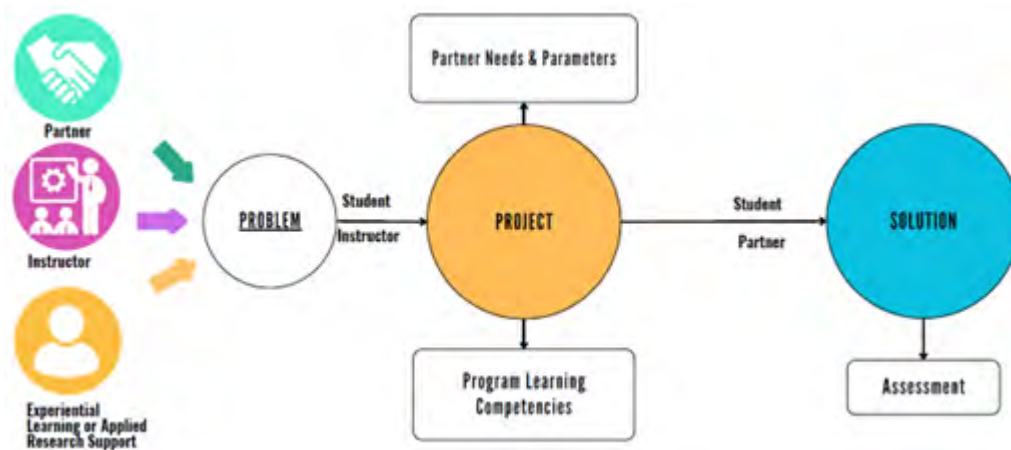
Applied research attempts to find solutions to existing problems, such as creating new or making improvements to processes, products or services. For most colleges in Canada, applied research requires a partner with a problem to be solved. There are four key components of an applied research project, starting with an industry or community **partner's** practical **problem** based on their specific **needs** and parameters and ending with a **deliverable**.



Applied Research and Innovation (ARI) benefits industry and community partners and has positive impacts on social and economic development. However, for VET institutions, the most important reason to engage in applied research is to enrich the learning experience for students. ARI in VET provides students with opportunities to engage directly with real-world problems. Applied research facilitated as a form of experiential education can increase student interest and motivation; real problems are more engaging than textbook cases. Students develop both technical and professional competencies, and they are better prepared for the workforce and further education. Employers are seeking graduates who have professional and employability skills, such as communication, collaboration, adaptability and problem-solving. Engaging in applied research can help students develop these skills.

Experiential learning is a highly effective pedagogy that has been shown to deepen, extend and enrich students' learning. Applied research is a form of experiential learning that, due to the involvement of an industry or community partner, is often considered career readiness or work-integrated learning. It can also be described as problem-based learning, project-based learning, challenge-based learning, and inquiry-based learning. Applied research projects attempt to solve a problem and can result in a new or improved process, product or service. Through applied research, VET institutions can engage with partners to enhance the learning experience for students **and** serve the socio-economic needs of local or regional companies and communities.

The Applied Research Project Process Diagram illustrates the key elements involved in developing an applied research project for vocational education and training programs. The diagram begins with **Problem Identification**, which involves finding a relevant problem that aligns with the course learning outcomes. This could be initiated by the partner, instructor, and or applied research staff. This is followed by **Partner Needs & Parameters**, where the partner is engaged to understand their needs, priorities, and constraints, and to define clear project objectives. Next, **Program or Course Learning Competencies** are reviewed by the instructor to identify relevant competencies within the curriculum, ensuring that the project objectives align with learning outcomes. Once the scope and details of the project are confirmed, **Solution Development** is facilitated by the student through collaborative discussions with the client on potential solutions, encouraging innovation and considering feasibility and sustainability. Finally, the student's work is assessed based on the relevant learning outcomes.



In order to embed applied research in the vocational education environment and culture, four success factors were identified and discussed: (1) institutional commitment and leadership; (2) instructor development and support; (3) curriculum and competency development; and (4) collaboration. Overall, the intervention shared NBCC's applied research approach, provided insights and recommendations for international VET providers, and facilitated knowledge exchange and collaboration among participants.





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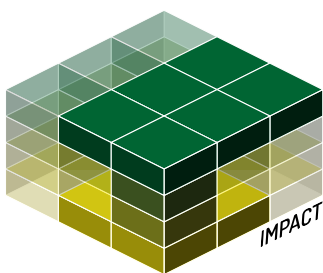
DIGEST 12

FRAMEWORK FOR APPLIED INNOVATION AND RESEARCH IN VET: DRIVING CHANGE IN VOCATIONAL EDUCATION

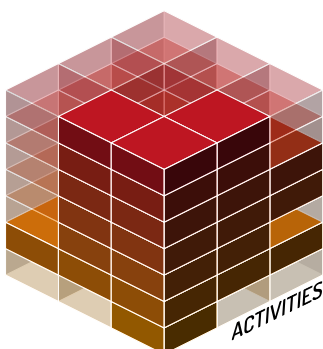
The AIRinVET Framework is an approach designed to highlight the role of vocational education and training (VET) centers in applied research and innovation (R&I), especially at the local and regional levels.

The framework emphasizes the importance of partnerships—particularly with Small and Medium-sized Enterprises (SMEs). Collaboration is at the heart of this approach, as it recognizes that innovation doesn't happen in isolation. By fostering closer ties with industry, VET centers can contribute meaningfully to the development and/or piloting of new products, services, and processes, positioning themselves as integral players in the regional innovation ecosystem.

The AIRinVET Framework is structured around four core dimensions that collectively provide a comprehensive approach for VET institutions to engage in applied research and innovation.



The first of these focuses on the **Impact** that VET institutions hope to make. This requires a deep reflection on the reasons behind their involvement in R&I—what motivates them, what outcomes they wish to achieve, and how they can align their efforts with the broader societal challenges of today, such as sustainability and digital transformation. By addressing these questions, institutions can ensure that their R&I activities are purposeful and result in meaningful change.

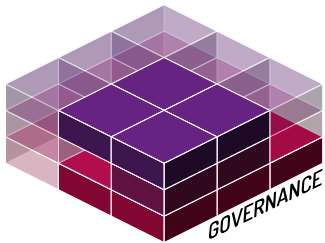


Equally important are the **Activities** that support R&I within the institution. This involves assessing the current functions of a VET center and identifying opportunities for growth. This dimension examines the internal dynamics of VET centers, specifically the functions and activities they carry out and how it supports R&I. It includes areas such as initial education, continuous learning, and entrepreneurial skill development. VET institutions must map their current functions and identify research capacity within the organization, ensuring alignment between existing knowledge and new R&I activities. The dimension emphasizes aligning research activities with existing expertise to avoid gaps in knowledge or skills.

By aligning R&I activities with the institution's existing expertise, VET centers can avoid unnecessary overlaps or gaps in their knowledge and skillsets, ensuring a smoother transition into new areas of research and innovation.



The third dimension delves into the specifics of **R&I activities** within VET institutions, including methodologies, research outcomes, and the role of regional ecosystems. VET centers are encouraged to collaborate with industry partners, SMEs, and other research institutions to leverage regional knowledge and resources. This dimension also addresses the need to train educators, researchers, and students to enhance their R&I skills and ensure they are equipped to engage in high-quality research and innovation.



All this requires organizing and sustaining R&I activities. The **Governance** dimension covers the strategies required to manage research projects, including internal barriers and enablers, the development of partnerships, and the recruitment of qualified personnel to lead R&I activities. It also stresses the importance of aligning research initiatives with broader institutional goals and policies, ensuring a sustainable and impactful R&I program.

What makes the AIRinVET Framework particularly valuable is its adaptability.

Every VET institution has its own strengths and challenges, so a one-size-fits-all approach simply wouldn't work. Instead, institutions can evaluate their current state of R&I activities. Each dimension has its areas and elements against which each VET center can assess themselves and will tailor the framework to its specific needs, creating a customized roadmap for initiating or scaling up R&I efforts. This ensures that every institution can find value within the framework, whether they are just beginning to explore R&I or are looking to expand their current activities.

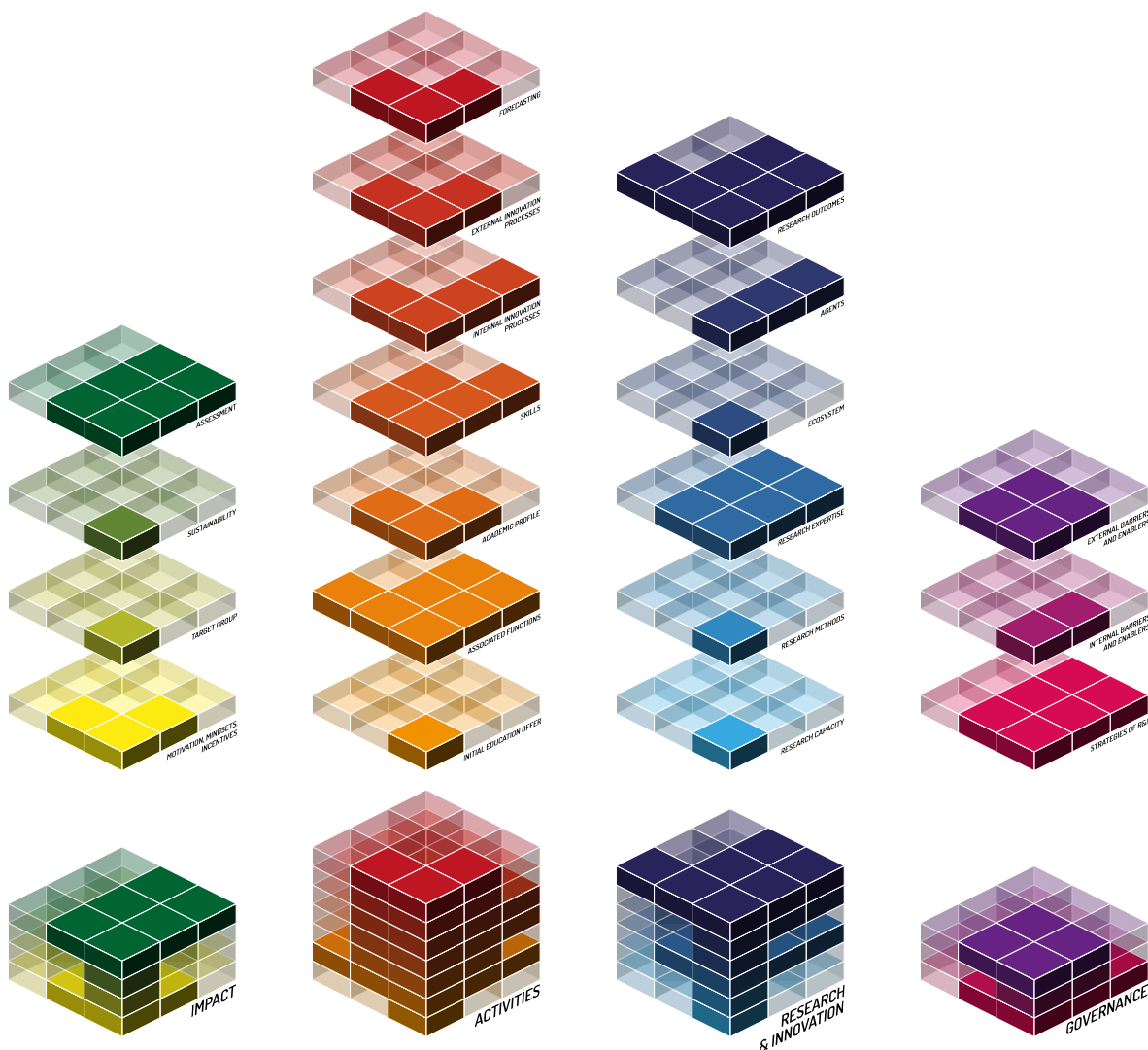


Image: AIRinVET framework dimensions and areas

By following this process, VET centers can more effectively integrate R&I activities into their organizational structures, fostering stronger ties with SMEs and other stakeholders. The ultimate goal is to create a lasting impact—not only for the institution itself but for the wider community. When VET centers contribute to solving real-world problems, whether through the development of new technologies or more efficient business processes, the benefits ripple outwards, enhancing the overall regional innovation landscape. In conclusion, the AIRinVET Framework provides VET centers with a comprehensive tool to strengthen their role in research and innovation.

Through a structured yet adaptable approach, it offers institutions the guidance they need to take their R&I activities to the next level. As VET centers grow into key players in regional innovation systems, they will not only improve their own educational outcomes but also contribute to the broader societal challenges we face today. Whether addressing sustainability, digital transformation, or the evolving needs of SMEs, VET institutions will be well-positioned to lead the way.

Through the framework institutions explore their own research capacity, focusing on the methodologies and outcomes of R&I initiatives. Whether it's developing prototypes, conducting proof-of-concept tests, or creating new research methodologies, VET centers are encouraged to collaborate with external partners—be it other educational institutions, local businesses, or research bodies. Training teachers, students, and researchers is another critical component. By enhancing the R&I skills of all stakeholders, VET institutions can ensure a higher level of engagement and innovation output, ultimately leading to greater impact in their local regions.

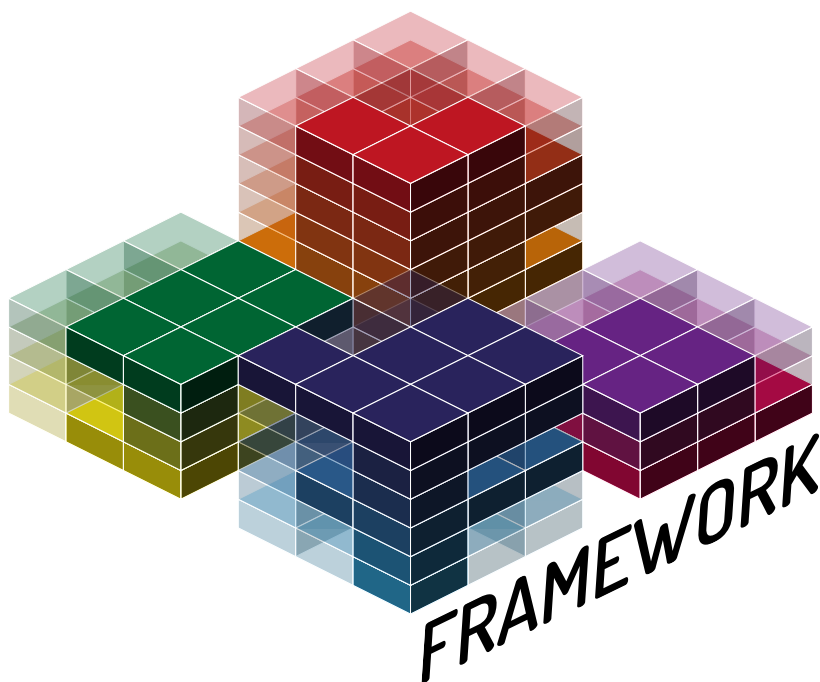


Image: AIRinVET framework

This framework acts as a flexible guide, enabling VET centers to engage with the evolving needs of industries and communities. Rather than being a rigid set of rules, it allows for adaptation to varying policy environments, local conditions, and the unique characteristics of individual institutions.

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Applied Innovation and Research in
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DIGEST 13

AIRIN VET ROADMAP: BUILDING RESEARCH & INNOVATION IN VET CENTRES

The **AIRinVET Roadmap** helps Vocational Education and Training (VET) Centres in Europe improve their research and innovation (R&I) work. It focuses on supporting regional needs, especially by working with small and medium-sized businesses (SMEs). This aligns with the European Commission's vision to make VET centres hubs for green and digital changes.

Self-Assessment Tool and Framework

The Roadmap includes a Diagnosis. VET Centres can use it to review and improve their R&I efforts. It is based on the AIRinVET Framework, which has four main areas:

1. **Impact:** Sets clear R&I goals and structures for motivation. Centres should focus on open mindsets, target groups, and sustainable results.
2. **Activities:** This involves VET organisations expand their core education and training activities, adding research activities to them. Centres should align R&I with regional needs and partner with SMEs.
3. **Research & Innovation:** Focuses on R&I skills, methods, and expertise-building. Recommendations aim to guide in building research capacity.
4. **Governance:** Supports creating strong R&I strategies, addressing barriers, and ensuring support within the institution.

How It Works

The Self-Assessment Tool includes statements that VET centres can rate from “Not Relevant” to “Advanced.” Based on these ratings, the tool provides general recommendations and resources to guide potential areas for improvement. The tool is available on the [AIRinVET website](#) for free use.

Continuous Improvement Cycle

The Roadmap promotes a **cyclical approach** to applied R&I, emphasizing continuous improvement. VET centres are encouraged to reassess their progress at regular intervals. This repeated cycle ensures that improvements align with the VET centre's goals and regional demands, providing a sustainable pathway for growth in their applied R&I capabilities.



Image: The cyclical use of the self-assessment tool and Roadmap recommendations

Key Benefits

Using the AIRinVET Roadmap, VET centres can detect their improvement areas and their development would:

- Improve their applied R&I capacity, suiting their specific context and situation.
- Strengthen connections with SMEs by tailoring R&I to local needs.
- Equip staff and students with future-ready skills.
- Embed applied R&I in their strategic vision, fostering innovation and regional development.

Conclusion

The AIRinVET Roadmap helps VET centres set a path to be an active member in the regional innovation ecosystem. It offers a practical guide for centres to support sustainable and knowledge-driven growth. For more, visit www.airinvet.eu/tools.





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DIGEST 14

STRENGTHENING APPLIED RESEARCH IN EUROPEAN VET SYSTEMS: RECOMMENDATIONS FROM THE AIRIN VET PROJECT

This Digest outlines 20 national- and European-level recommendations that underscore the essential role of Vocational Education and Training (VET) as a vital force in applied research and innovation, based on findings from the AIRinVET project. These recommendations aim to provide actionable insights and recognise the unique and diverse approaches to applied research across Europe, reflecting the project's commitment to fostering innovation and collaboration among VET institutions, SMEs, and broader research ecosystems.

National-level Recommendations

1. **Embed applied research in national agendas:** By formally integrating applied research into VET frameworks, curricula, and policies, governments can ensure that VET centres are recognised as key contributors to regional innovation ecosystems.
2. **Foster Public-Private Partnerships (PPPs):** Structured collaboration between VET institutions, small and medium-sized enterprises (SMEs), and universities aligns research with industry needs, enhancing the relevance of both educational and business practices.
3. **Promote Centres of Vocational Excellence (COVEs):** Supporting COVEs as hubs for applied research enables VET centres to lead innovation efforts, leveraging infrastructure and expertise for regional development.
4. **Develop applied research ecosystems:** Establishing local networks that link VET institutions, SMEs, and research bodies strengthens knowledge transfer and fosters collaboration across sectors.
5. **Secure funding for applied research:** Dedicated national funding programmes can build research capacity, ensuring institutions have the resources and trained staff to undertake impactful projects.
6. **Expand human resource investment:** Stable, long-term funding for research personnel ensures sustained institutional growth and helps secure complementary funding sources.
7. **Create national coordinating bodies:** National entities can streamline collaboration between VET and SMEs by managing policies, funding, intellectual property rights, and partnerships.
8. **Broaden the role of VET centres:** Recognising applied research as a core activity for VET institutions elevates their status as equal contributors to innovation and economic development.
9. **Increase regional funding for local innovation:** Targeted funding for applied research projects tied to regional priorities drives economic and industrial growth.
10. **Support lifelong learning pathways:** Flexible qualification systems and bridging courses ensure permeability between professional and academic programmes, fostering lifelong education opportunities.

European-level Recommendations

1. **Disseminate knowledge of applied research:** A pan-European platform can make research methods, best practices, and outcomes widely accessible, empowering VET institutions to build capacity without duplicating efforts.
2. **Align applied research with EU policies:** Integrating VET-applied research into initiatives like the Green Deal and Digital Europe aligns education with Europe's sustainability and digital transformation goals.
3. **Promote work-based learning:** Linking applied research with experiential and dual learning models equips students with practical skills while driving industry innovation.
4. **Integrate applied research into Quality Assurance (QA):** Recognising applied research in European QA frameworks ensures consistent standards and highlights its importance in education and innovation.
5. **Advocate shared responsibility for funding:** Tripartite funding models, involving governments, VET centres, and SMEs, distribute financial responsibilities, making applied research more sustainable.
6. **Ensure long-term funding stability:** Multi-annual funding commitments through programmes like Horizon Europe and Erasmus+ prevent project fragmentation and promote sustained research efforts.
7. **Establish clear intellectual property guidelines:** European-level intellectual property rules protect collaboration partners while enabling broader dissemination of innovations through open access.
8. **Launch public awareness campaigns:** Highlighting VET-applied research success stories can enhance political and societal support across Europe.
9. **Build SME collaboration capacity:** Training, tools, and resources for VET staff involved in research partnerships can strengthen relationships and maximise research impact.
10. **Standardise terminology:** A unified vocabulary for applied research in VET simplifies cross-border communication, with the [AIRinVET framework](#) serving as a blueprint for collaboration.

By addressing the challenges and opportunities within VET systems, the AIRinVET recommendations aim to elevate the quality and impact of applied research across Europe, ensuring that VET institutions play a pivotal role in shaping the future of education, research, and innovation.



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AIRinVET partners: TKNIKA - Department of education Basque Government, EURASHE, Berufliche Hochschule Hamburg, Hanse Parliament, KATAPULT, ISSO, AFM Cluster for Advanced & Digital Manufacturing and IMH - Advanced and Digital Manufacturing Campus.



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