



Applied Innovation and Research in
Vocational Education and Training

D6.6 – Dissemination of AR digests

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D6.6 Dissemination of AR digests

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Publishable executive summary

This document summarizes the key activities of the AIRinVET project from January to December 2023, overseen by ISSO for the regular dissemination of AIRinVET digests. These 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.

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

In the current version of this document, the first four digests are included.

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1. Introduction

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This document will be updated in month 18 (June '24). A final version will be made at the end of the project in month 24 (December 24).

2. Digests planning

The digests are short written report 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 are planned to follow the deliverables production.

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

1. Digest, process (including glossary), and interviews – 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 responsibility to produce the digests lies on the partner responsible of the deliverable.

PLANNING				
Month	Digest	Content proposal	Partner	Source
nov-23	1	process (including glossary), and interviews	Tknika	D2.2
dic-23	2	findings	Tknika	D2.2
ene-24	3	policy&financial models findings	EURASHE	D2.2
feb-24	4	SMEs engagement in AR in VET	HP	D3.2
mar-24	5	Engagement of VET centres AR	HP	D3.2
abr-24	6	Framework for AR in VET	Katapult	D4.2
may-24	7	Roadmap for AR in VET	Katapult	D4.3
jun-24	8	intervention procedure, EURASHE	EURASHE	D5.2
jul-24	9	Intervention 1: Extrapolate Tkgune, Euskadi	Tknika	D5.2
ago-24	10	Intervention 2: Extrapolate Katapult’s experience, the Netherlands	Katapult	D5.2
sep-24	11	Intervention 3: Adapt RTOs/universities approach to VET contexts, EURASHE	EURASHE	D5.2
oct-24	12	Intervention 4: Enhance learners’ curriculum - Application of work process analysis (WPA) for SME’s in house trainings case, Germany	BHH	D5.2
nov-24	13	Intervention 5: Extrapolation of the Framework for experiential learning and renewed core employability competencies. New Brunswick Community College (NBCC)’s experience, Canada	New Brunswick	D5.2

Figure 1: Digests planning

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, entrepreneurs

It's 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, the content of a specific deliverable and the outputs.

3. Digests publication

For December 2023 (month 12) we have two deliverable reports ready and published.

- The Applied Research in VET Glossary (D2.1)
- The Publication on AR actors, business models and case studies (D2.2)

Based on these reports and up to this point, five digests have been prepared and four published:

Publication date	Digest	Content	Link
October 2023	1	Supporting AR in VET (Policy & financial models' findings)	Digest 1
November 2023	2	Mapping AR in VET (process and findings)	Digest 2
November 2023	3	Case studies examples (DE, NL, ES)	Digest 3
December 2023	4	Why do we need a glossary?	Digest 4

Figure 2: Digests status December 2023

The publication of digests is following the planning. By the end of the project there might be a couple more digests than scheduled.

3.1 Digests dissemination

Digests are published on the project website and are being published also through social net and project newsletter. Partners can translate the digests if necessary to reach specific audience. This will be done during project lifetime and afterwards.

Dissemination tools are covered in the annual dissemination report.

Appendix– Collection of digests

Digest 1: Supporting Applied Research in Vocational Education and Training

Digest 2: Applied Research in Vocational Education and Training (VET): understanding and mapping.

Digest 3: Applied Research Initiatives in Manufacturing, Urban Greening, and Digitalization

Digest 4: Do we need a glossary?

Digest 5: Examples of applied research by VET centres in the EU



Applied Innovation and Research in
Vocational Education and Training

DIGEST 2

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).

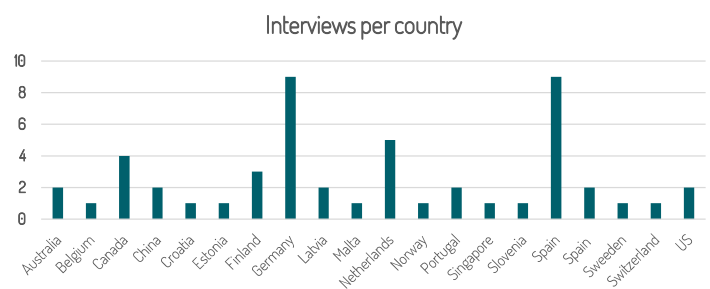
Higher education organizations in Europe, Canada, and Australia systematically organize applied research, whereas many VET organizations in Europe lack a clear understanding and systematic approach to applied research.

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.





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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/>

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.



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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

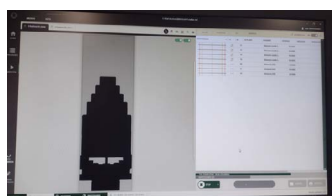
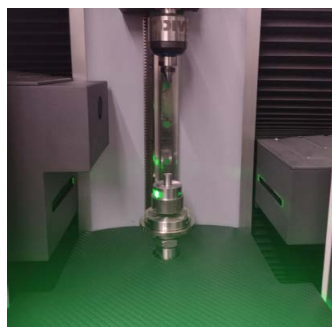
- Communication between production and measuring machines
- Communication for FANUC 32i control.
- Automatic compensation of dimensional errors automatically between measuring machine and production machine
- Compensation and communication between machines is possible, opening a very interesting and 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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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 automaticaly 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

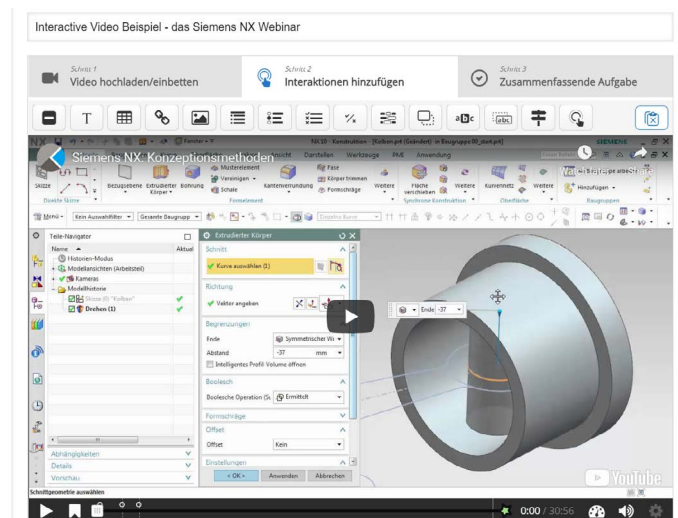
The project "DigiNet.Air – Digital Learning Network in the Aviation Industry of the Hamburg Metropolitan Region" aims to support and accompany small and medium-sized companies in digital structural change. To this end, DigiNet.Air develops low-threshold and project-like formats that are directly geared 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](#)!

The background of the top half of the page is a photograph of a desk. On the left, a portion of a laptop keyboard is visible. In the center, a person's hands are writing in a yellow-lined notebook with a blue pen. To the right, a black smartphone is connected to a black microphone on a tripod stand. The entire scene is set against a light grey desk surface.

DIGEST 5 INTERVIEWS EXAMPLES

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.



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.

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- Engagement of Stakeholders: Actively collaborates with SMEs, with shared funding and co-financed business projects.



Colophon



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