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Edited and coordinated by:

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Contents

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1 INTRODUCTION

The aim of the present study is to determine the prerequisites that need to be established in order to implement Applied Research in VET (Vocational Education and Training) in the countries of the consortium (Cyprus, Germany, Greece, Italy, Spain, Sweden). The goal is to obtain a comprehensive understanding from different perspectives, including those who are involved in vocational education and training in various countries, either from a research perspective or as practitioners. One specific focus is to identify the high-level skills required by VET professionals to conduct and supervise applied research projects.

To approach this research question, qualitative, semi-structured interviews were initially conducted with representatives from various segments of the VET system in all partner countries. The interviewees were categorized into the following groups:

- Experts who have conducted research on the topic of Applied Research in VET.
- Teachers: Vocational training researchers, officials in the vocational school teachers' association, vocational school teachers, headmasters of vocational schools.
- Students: Student representatives from vocational schools.
- Business: Private sector managers.

In total, 31 individuals were interviewed, with a minimum of three interviews conducted in each partner country (Cyprus, Germany, Greece, Italy, Spain, Sweden). The interviews involved 13 women and 18 men, ranging in age from 23 to 68 years old. The interviews took place between July 11, 2023, and September 27, 2023.

Following the interviews, a transnational focus group discussion was conducted to evaluate the results. Participants in the focus group discussions were nominated by the consortium's organizations in the partner countries and selected by the research team at the University of Applied Sciences. The focus group discussion took place on October 11, 2023, and lasted for 90 minutes. Experts from four of the six partner countries participated in the discussion.

Chapter 2 provides an overview of the methodological approach, while Chapter 3 presents the results of the qualitative interviews at the country level. Chapter 4 follows with an analysis of different attention areas, and Chapter 5 presents the results of the focus group discussion. Chapter 6 brings together the study's findings.

As highlighted in the NEARVET Methodological Concept by Richard Parkes (Parkes, R. (ed.) et al. (2023), ‘Network for Applied Research in VET: Methodological Concept Study’, NEARVET) there is no universally accepted understanding of what Applied Research in Vocational Education and Training precisely entails in the partner countries (see also Chapter 4.1 of this study). Therefore, interviewees were presented with an explanation of the terminology in advance to promote understanding: "As applied research, we mean research that focuses on solving practical problems." This is the understanding assumed in this study. If interviewees

provided alternative definitions of the terminology, these were mentioned and discussed accordingly.

2 METHODOLOGICAL APPROACH

Based on national literature reviews and desk research (see also the Parkes, R. (ed.) et al. (2023), 'Network for Applied Research in VET: Methodological Concept Study', NEARVET), a qualitative guideline for interviews conduction was developed (see APPENDIX). This guide included 10 questions, provided to the interviewers in both articulated form and as keywords in English. Since experiences in the field of qualitative research vary widely among different partners in this consortium, an introduction to qualitative interviews and tips on various question formulations were provided. This included advice such as:

> *"In qualitative guided interviews, it is important to put the experts into a flow of thought and speech. Therefore, please give the subject pauses to think and allow time. If the subject does not know an answer directly, signal to him/her verbally and/or non-verbally that you have the time. Example: '...take your time with the answer. This is not a problem.'"*
>
> *"Try to clarify questions of understanding immediately. Always ask open questions and not yes/no questions."*
>
> *"Once again: The goal is to have an exciting discussion that will help us to answer our question."*

Additionally, a session was held where questions about the procedure and the guide could be asked. The interview guide was initially coordinated with RINOVA. Subsequently, a pretest with the guide took place in Germany. Since the pretest did not reveal any requests for adjustments, it could also be included in the study. The guide was then finally sent to the partners in the different countries in English (see APPENDIX with the guidelines).

The interviews were recorded at a minimum as audio. The subjects agreed to this recording in advance. To avoid any language barriers, the interviews were conducted in the respective national languages. In exceptional cases, English was used if an expert could be assigned to a country, but the subject was not a native speaker from the country and therefore felt more comfortable with English. The partners were asked to enter the answers in bullet points into a form and make it available to the Fachhochschule des Mittelstands, which took over the evaluation of the interviews. In case of discrepancies with the keyword protocols, the interviewers were queried and asked to listen to the audio recording again, if in doubt.

The interview evaluations were sent to the partners for verification before publication, so they could check whether the contents were understood correctly. The interviews took place between 07/11/2023 and 09/27/2023 and conducted either in person or via online tools, depending on what was more suitable and feasible for the subjects. The conversations lasted between 51 minutes and 1.5 hours. An exception is the interview from Sweden. Here, a group

of nine experts from the fields of Teachers, Students, and Employers met for a three-hour interview.

Following the qualitative guided interviews, informal focus group discussions took place. Through the analysis of the interviews and informal focus group discussions, it quickly became clear that an international focus group, confronted with the results of the interviews and the methodological concept, would be more fruitful than national focus groups. When applying, the research group assumed that the results from the interviews would be country- specific. We cannot confirm this assumption after analysing the interviews: While the interview material is indeed heterogeneous, it is by no means predominantly nation specific.

Participants in the focus group discussions were partly drawn from interview participants. An artificial, inhomogeneous, and conscious selection was made. Furthermore, care was taken to ensure that participants felt comfortable discussing in the English language, to prevent potential non-participation due to a language barrier. The aim of the group discussion was to condense the material obtained in the qualitative interviews. Care was taken to allow the group to develop in its structuredness.[1] This means that questions were only asked when the discussion began to falter. Anchor points were obtained from the interviews as well as the methodological concept. The group discussion lasted 90 minutes. It took place over Microsoft Teams. Here too, an audio recording was made. The discussion was summarized in bullet points. Subsequently, the discussion results were made available to the participants. They could comment on the results if they felt misunderstood. This is just a reference to a quality criterion of qualitative research that was applied in this study.

2.1 Description of Participants

This section provides a succinct presentation of the individual participants to facilitate a deeper understanding of those surveyed. The respondents are introduced, categorized by country:

CYPRUS

Head of Training & Development and Human Resources: Her responsibilities in the HR domain encompass recruitment as well as the creation and implementation of the staff performance management system. Regarding Training & Development, she oversees the internal team, manages collaborations with external training partners, and primarily engages in client communications to ascertain training needs, draft curricula, deliver training courses, and execute the training program — essentially overseeing the entire Training & Development cycle. Her duties also include providing quotations and customizing offerings to clients. She holds a bachelor's degree in Pedagogy, Primary Education, and a postgraduate degree in Human Resources & Organizational Behaviour from CIIM (Cyprus International Institute of Management). Age: 37.

Managing Director Cyprus: His responsibilities encompass managing the organization, coordinating department heads, handling branding-related matters of the organization,

developing service offerings in Cyprus and internationally, as well as dealing with training, information dissemination, strategic plan development, company objectives, and networking both within Cyprus and internationally. His educational background includes an MBA from European University Cyprus and a Bachelor's in Business Administration from Cyprus College. Age: 41.

College Director: His responsibilities entail organizing staff, programs, and administration — essentially overseeing all managerial aspects. With over 20 years in this role, he previously worked more heavily in promotion/marketing departments, focusing on administration but located abroad. For the past two decades, however, his work has been more localized in a Cypriot context. He holds a degree in Business Administration. Age: 47.

GERMANY

German Professor: He has worked as a university lecturer while simultaneously holding a top-management position in a company, where he was responsible for the education and training sector. He continues to serve as a managing director, delivers numerous lectures, works as a business consultant, and is the author of more than 200 publications. He studied business psychology and subsequently earned a doctorate in the same field. Age: 68.

Former School Principal: The retired school principal and teacher previously served 27 years as the head of a vocational school. She conducts training sessions with all school principals during their initial years in office and is a member of the trainer pool in Lower Saxony. Age: 67.

Vice President: The Vice President serves as the Vice President Global Education at a Technical Training Center. Working at the interface between research/education and vocational training, he deals with numerous "cases" and stakeholders daily. He received his academic education in France, qualifying as a Graduate Engineer, and subsequently pursued a doctorate while also teaching as an assistant teacher. Age: 60.

GREECE

VET-Tourism-Student: Possessing no personal connections to the field of applied research in Vocational Education and Training (VET) aside from “the little research” undertaken during her studies, she enrolled in a two-year VET program in tourism and hospitality, completed her traineeship, and is now pursuing university studies in tourism. Age: 29.

Owner of an SME: His personal connections with applied research in VET involve collaborations with university professors and a network of partners, including biochemists and botanists who continue to provide support. Engaging in the production and processing of agricultural products, he owns a Small and Medium-sized Enterprise (SME), located in Larissa. A civil engineer with extensive experience in a construction company, his vision has always been to establish a company that showcases the finest herbs of Greece. He is in his forties.

Coordinator: Predominantly involved in coordinating various company areas, he principally handles sports analytics, attracting new customers, and satisfying existing ones. He graduated from the Polytechnic School, specializing in Information and Communication Systems

Engineering. The company encompasses analytics at large, offering training through seminars in diverse domains such as healthcare, management, HR, finance, business analysis, and sports analysis. Additionally, the company provides asynchronous training to trainees, affording them the flexibility to attend programs at their convenience. He has been with the company for the past two years. Age: 27.

ITALY

VET-Trainer: Serving as the Head of Apprenticeship and Lifelong Learning, the VET-Trainer supervises the related activities of six accredited centers on behalf of the regional Association. He facilitates interactions with Employment Services and connections with vocational training courses dedicated to minors or compulsory school students. Furthermore, he oversees training and up-skilling interventions for VET trainers and staff. He holds a degree in Pedagogy. Age: 57.

Italian Professor: As the liaison to school organizations in a Regional School Office, she primarily monitors the quality of VET course design in a region of Italy, having occupied this role for seven years. Her career has spanned roles as an Administrative Officer in a company, an educational designer of vocational courses for the region in Italy, a designer of training courses for trainers, a contact person for networks between schools and companies, and a high school teacher. Her academic background includes a degree in economics and business, a Master's degree in "Economy and Politics of International Institutions" (not completed), and a Second-Level Master's in "Management of School Institutions". Age: 65.

Pedagogical Researcher: Teaching Italian, history, and geography in middle school, she also collaborates with various professional associations in the teaching field. In addition to her instructional role, she is a Researcher in the Pedagogical field and has earned a PhD in "Teacher and Researcher Skills and Training". Her career embodies a research-oriented teaching approach, intertwining theoretical and practical aspects, which greatly influenced her decision to return to school teaching. Her educational qualifications include a Bachelor of Literature and Arts and a PhD in Teacher Education. Age: 43.

Automation & Engineering Manager: Serving as a tutor and trainer for students in applied research projects and a trainer for teachers at technical and vocational schools, he has dedicated six years to these roles. His career path includes serving as a university researcher, co-supervising several research theses, working as a researcher for a university consortium, and subsequently as a researcher in a startup specializing in aerial robotics, particularly in drone development, before transitioning to applied research in industrial robotics. He holds a Bachelor's and Master's degree in automation engineering. Age: 39.

SPAIN

Managing Director: Regularly interacting with the Government of Aragon, directors of vocational training centers (both public and private), and directors and HR managers of the 110 companies associated with the cluster, his responsibilities center on strategizing, attracting new members, managing economic and financial controls, and coordinating cluster projects. His career commenced as a purchasing and logistics manager in a multinational

company, a role he held for six years. He is equipped with a degree in Economics and Business Administration and a PLD (Programme for Leadership Development) Master's degree from IESE Business School. He has been in his current role for 15 years. Age: 51.

General Secretary: Engaging primarily with a Vocational Training Centre and the provincial services of Education, Culture and Sport, and Industry and Innovation of the Government, his chief responsibilities include managing and coordinating the federation's activities, overseeing economic-financial controls, negotiating collective agreements for metal employers, and providing technical advice to companies to assist with and resolve daily issues. With 34 years of experience as a general secretary, his prior roles include four years as an engineer in a company and two years as a vocational teacher. He holds a technical engineering degree with a specialization in electronics. Age: 61.

Head of Studies for Vocational Training Cycles: Engaged in teaching both intermediate and advanced cycles at a VET School and involved in various projects conducted by the school, He has accumulated three years of experience in his current role as head of studies. His professional background includes over five years as a teacher in both intermediate and higher education, and a three-year stint as an R&D&I engineer. He holds degrees in Technical Electronic Engineering and Industrial Organisation Engineering. Age: 41.

Pedagogical Director: In her role as the pedagogical director of intermediate and advanced cycles, she has been an integral part of numerous projects undertaken by the school and has liaised with and received support from the Department of Education, Culture and Sport of the Government of Aragon for several project developments. With three years of experience in her present position, her previous role involved serving as the head of studies while concurrently teaching. Her educational background includes a diploma in Labour Relations and an associate degree in Labour Sciences. Age: 40.

SWEDEN

Student 1: Engaged in the 3rd period Work Based Learning (WBL) in the Geographical Information System (GIS) program. Age: 23. Female.
Student 2: Participating in the 3rd period WBL in construction development with sustainable technology. Age: 28. Male.
Student 3: Undertaking the 3rd period WBL in Healthcare technology. Age: 32. Female.
Student 4: Enrolled in the 3rd period WBL in Artificial Intelligence technology. Age: 25. Male.
Student 5: In the 3rd period in Commercial Photographer higher VET. Age: 34. Female.

Teacher 1: Headteacher in programming. Age: 38. Male.
Teacher 2**:** Serves as program administrator and teacher in project management. Age: 44. Female.
Teacher 3**:** Engineering teacher. Age: 53. Male.
Teacher 4**:** Administrator for WBL planning. Age: 49. Female.
Teacher 5**:** Headteacher in digital media. Age: 28. Male.

Employer 1: HR manager in a Construction company in Uppsala. Age: 55. Male.
Employer 2**:** Tutor in a Media company in Stockholm. Age: 29. Female.
Employer 3**:** Tutor in Healthcare technology, Uppsala. Age: 36. Male.
Employer 4**:** HR manager in an IT company in Gävle. Age: 29. Female.

3 NATIONAL-LEVEL-FINDINGS

In this chapter the outcomes of qualitative interviews at the country level are presented. It is pivotal, especially at this juncture, to highlight that, given the limited number of participants in this study, the statements cannot be deemed representative of the educational programs in the countries under consideration. Nevertheless, the experts' responses provide valuable insights into the respective training systems.

3.1 Cyprus

In Cyprus, Vocational Education and Training (VET) is characterized by a development that, according to the College Director, has begun over the past 20 years and is currently in an incipient stage. Regarding the implementation of Applied Research in VET, he critically notes the accessibility and comprehensibility: "We need to make the concept more understandable because if you're dealing with more professional fields, you want simpler terminology." Herein lies the importance of clear definitions and understandable terminologies for professionals in the field. The Managing Director associates "applied research always with the industry because we are involved in industrial development projects." His definition of applied research tends to be more practically oriented, especially outside the service sector. Concerning terminology, he emphasizes that the term "applied research" precisely expresses what is needed and adds: "I insist that applied research would be the most accessible definition." The Head of Training regards applied research in VET as "more systematized" and as an opportunity for a "potentially more holistic approach to wider areas." The concept implies a desire for a well-organized, data-driven approach that creates programs and services through effective data utilization. The Head of Training states: "My mind went to something more organized, more systematic, when I heard about applied research in vocational training." However, he sees a need for a renaming, as it was suggested that "Linking vocational training curricula with the market" would be a more apt designation. A recurring theme with the Head of Training is the necessity to conduct research on a larger scale, under a "larger umbrella," and with a "more systematic and holistic approach." Given the millions of working individuals interested in developing their skills, it is imperative that actions be taken in this regard. The participant emphasizes: "I think it is essential that something like this is done, whether it's innovative or not." The term "innovation" is described as particularly appealing to most HR professionals, employers, and employees since it implies the implementation of new and improved practices. "Innovation is a term that would gain traction more easily because most HR and most employers and employees are interested in innovations," says the Head of Training.

The necessity of a closer connection and interaction between educational institutions and companies has been repeatedly emphasized: “Companies need to be involved with educational organisations.” A dual-track model, where full-time trainers in the educational sector and part-time workers who are also active in companies coexist, could create a stronger link and effective assistance between trainers and companies. “Therefore, there should be a connection between the trainers and the companies, and they should help each other,” asserts the College Director. For effective implementation of applied research in the VET sector, the Managing Director underscores the importance of thoughtful planning and execution of seminars and training programs. Thus, companies should be actively involved in the diagnosis of needs by "creating a plan, developing a pre-specification, [and] discussing with the business." Despite the observable willingness of companies to invest in training, the interview partner identifies a challenge: If companies see no added value in the training, "they simply stop, and whatever training they want to conduct, they do it in a different way." It is crucial for applied research that companies, and their employees play a central role and foster a culture of participation and diligence, according to the Head of Training. “Yes, let’s get involved,” “yes, let’s do it right,” “yes, let’s look at it in detail,” “yes, that’s how it should be done” – this mentality plays a vital role in the success of applied research in companies.

Remarkably, the role of teaching staff and their further education is emphasized. The necessity of continuous learning processes for trainers and teachers is explicitly highlighted by the Managing Director: "We need to invest in these people so they can learn the new trends and practices that are out there." Moreover, trainers need to be “flexible,” “communicative,” and “organized” and should be able to “provide the solutions they need.” Developing research skills in both teachers and trainees is a key point. The skills that trainers need in the field of applied research include a thorough understanding of research, digital competencies, and communication skills. Similarly, trainees should also be trained in digital skills and communication so they can effectively interact with companies, as per the College Director. Trainers should be able to prioritize the benefits for the trainees while establishing credibility and trust, according to the Head of Training. They also need to understand the motivations of the participants and should be able to convey knowledge effectively and flexibly. It is emphasized that “they should be very well-trained in what they communicate, so they can be trustworthy and build credibility.” The Head of Training also addresses a challenge here: time and money are constant barriers when it comes to training staff, raising questions like: “Why should they invest seven hours in a program, why should they miss 14 hours of work?”. Meanwhile, the interest in and demand for training and practical tools, especially in Cyprus, is described as “very good.” A critical point here is also the evaluation of programs. Although some vocational training centers and companies conduct their own evaluations, there are those who do not. This underscores the necessity to enhance the evaluation component of programs.

Involving all stakeholders in every company, including the trainees, has been identified as crucial: “It is important to involve the trainee, who must be constantly educated.” Furthermore, the Director advocates for a consortium approach, where research organizations, companies, students, and trainers act together to develop an integrated research and application approach. The participation of all stakeholders and proper management of the organizations are also crucial, according to the Managing Director: "If the

manager or HR or the person responsible for the company is not involved, if the organization, the center is not managed properly [...], if there is no proper framework in terms of the public stakeholders," the likelihood of a successful research process is low.
The active role of vocational and professional schools, not only as a training site but also as a pioneer and guide for practical, applied research, is also emphasized: “If the faculty is not actively involved in this process, it sends exactly the opposite messages both to the participants and to the customers, etc.” The need for applied research is particularly apparent in the tourism sector, and “there is a great need there to get some results,” emphasizes the College Director. Here, research should not only be conducted for its own sake but also involving the companies themselves: “It's good to have research done by companies for/in companies that are involved.” In this sense, it is not only necessary to present research findings but also to involve the company throughout the entire research process and “it would certainly be very important for businesses to see the results.”

A clear strategy and policy for promoting research, including research projects that could be funded by the EU, was also discussed: "Give some research projects funded by Europe. The schools may not have the possibility to access such things," the College Director demands. This is about creating a framework in which both educational institutions and companies can equally drive and benefit from research and development. The Managing Director also expresses himself in a similar direction: At the political level, he sees a clear need for incentives for companies to develop and implement applied research, especially in the practical and industrial sector. These incentives could help intensify cooperation between public and private sectors and thus facilitate the implementation of applied research. Policies should develop and implement consistent and robust strategies to support applied research, says the Head of Training. It is crucial that policy measures not only raise awareness but also provide specific mechanisms and infrastructures to enable and support high-quality applied research. Regarding digital platforms, the College Director emphasizes the importance of usability and collaboration in developing such tools: "The design and the infrastructure have to be compatible. Also, again, it should be done together with companies and not by some people who think it would be good for companies." This underlines the necessity of joint development of platforms by all relevant stakeholders to ensure that the end products meet needs and expectations. The multifaceted statements of the interview partners reflect the complexity and the multi-dimensional challenges of applying and implementing applied research in the field of vocational education. However, they also provide insight into possible strategies and concepts, such as stakeholder integration, ongoing teacher training, and political support mechanisms, which could contribute to the improvement and sustainable implementation of applied research in vocational education. Applied research can serve as a link here. Because so far, the gap between theory and practice remains one of the biggest challenges in applied research in VET.

3.2 Germany

The former school principal highlights several difficulties and challenges in the current Vocational Education and Training (VET) system in Germany, with particular emphasis on the declined prestige of dual vocational training compared to university education. Her perception signals a shift in societal valuation of these educational forms, and she further describes in-

company training as no longer contemporary. Although the demand for dual education is high, according to the German professor, he assesses the current image of vocational training as not particularly positive. This assessment is based on a noticeable number of young individuals preferring university studies to vocational training, unfortunately leading to a high rate of student dropouts. It becomes evident that there is a necessity to modernize both company training centers and vocational schools in terms of their equipment and methods, adapting them to the altered needs of the trainees. A growing trend among parents to direct their children towards university education is noticeable. The Vice-President postulates the thesis that, should this trend continue, vocational education in Germany might become obsolete, resulting in an increased recruitment of skilled workers from abroad.

Regarding Applied Research in VET, the Vice-President characterizes applied research as a type of research whose results have a direct impact on industrial applications and thus should generate solutions for various industrial application areas. Here, the focus is not on confirming or challenging theoretical foundations, but rather on the immediate, application-oriented development of solutions. The term "applied research" seems apt and more relevant than ever to him, especially in the context of vocational education. The former school principal emphasizes the fundamental role of research in vocational education (VET) but insists that research should essentially have an application-oriented character. Her viewpoint entails the belief that research should always be practice-oriented and provide solutions for existing problems to ultimately yield tangible benefits. She suggests that the emphasis should be less on terminology but more on clear communication of research purpose and subject matter to avoid misunderstandings or misinterpretations of the term “applied research”. For the German professor, the term "Applied Research" is firmly established and should not be modified as it is widely recognized in cooperative universities. He underscores the fundamental value of Applied Research as a vital link between research and application and thus as a potential innovation driver for training companies.

The Vice-President underscores the significance of close cooperation between innovation and vocational education. In this context, he refers to the integration of new topics into curricula and training institutions and emphasizes the necessity for adapting them accordingly. He also suggests establishing more inter-company training centers, particularly in regions with a high industrial density, which would, in turn, require government subsidies.

The Vice-President emphasizes a significant aspect regarding the adequate training of teaching staff. Managing technological upheavals and implementing them in vocational school education often appear as hurdles, occasionally meeting resistance. Both during and after teacher training, the Vice-President sees a pivotal role for applied research and the imparting of skills that assist in adequately conveying content to students. He advocates for the transmission of entrepreneurial skills to teaching staff and proposes Key Performance Indicators (KPIs) to verify teaching quality before an employment relationship is established. The German professor also focuses on the role of teachers, underlining the necessity for them to be open and receptive to new subjects. This includes maintaining contacts with universities to ensure continuous exchange and knowledge transfer. Moreover, the German professor calls upon politics to provide teachers with more leeway for innovative methods and current techniques to address the rapid changes, especially in the context of digitalization and AI.

The Vice-President also demands that politics invest in vocational education and its image. This should contribute to increasing interest in high-quality vocational education among all population groups (domestic and immigrant). The former school principal highlights the role of pedagogical competence, particularly in dealing with trainees with a migration background, stressing the need for differentiated and social competence among trainers to appropriately address the individual needs and challenges of learners. Regarding measures to improve the system, she proposes a range of strategies, including:

- Implementing regular feedback cycles between schools and training companies,
- Establishing regular exchanges of current scientific findings and practical knowledge between trainers and teachers, and
- Closer cooperation between vocational schools and companies, particularly through unified communication and goal setting.

The German professor considers speed essential when it comes to political measures to promote Applied Research. Here, politics should create frameworks that motivate vocational schools towards more innovation and creativity. Schools and teachers should be inspired and possibly supported by further training to keep their learning content always up-to-date and relevant.

The former school principal also outlines specific tasks and responsibilities for political and institutional actors, including the need for political levels to provide clear guidelines and support for teachers. Moreover, she sees a significant role for chambers, such as the Chamber of Crafts, in regulating and quality controlling training practices. Her suggestion to introduce quality labels for exemplary training facilities reflects a desire for increased visibility of best practices and active quality promotion.

Companies, according to the Vice-President, are obliged to communicate the needs for technologies and the accompanying changes in the working environment to schools to optimize their qualification capabilities. Conversely, schools should open themselves to industry. As an example of exchange between institutions, he mentions seminar days for networking and information exchange or "open days" at schools.

Regarding students, the Vice-President emphasizes the essential role of their curiosity, which needs to be aroused, promoted, and demanded to ensure effective vocational training. Finally, the former school principal advocates for a stronger link between university and vocational education to enhance the attractiveness and value of vocational education. She underscores the principle of "equivalence, not sameness" and proposes models in which, for example, dual training is academically recognized, thus enabling further educational pathways. Conversely, the German professor considers visions and forward-thinking essential for the further development of VET. Focus should be particularly placed on future technologies and developments, exploring how to prepare young people for these. His vision is encapsulated in the guiding principle: "We are future-proofing Europe through vocational training."

Moreover, the Vice-President points to the importance of exchanging best-practice examples, discussing and adapting curricula, and utilizing digital possibilities like E-Learning and a digital library. He envisions a "Wikipedia-like" platform where needs and ideas can be shared to find like-minded individuals and approaches. Additionally, the German professor recommends initiating annual congresses that present new scientific findings while simultaneously providing a space for exchanging best practices. He sees the continuous building and maintaining of networks, particularly on an international level, as a crucial point to facilitate and enhance scientific and practical transfer. In the context of digitalization and platform usage, the German professor focuses on clear benefits, striking design, and extensive content information, which, for example, explain the German dual training system. Moreover, the platform should encourage and promote content exchange and enrichment of its users.

3.3 Greece

Initially, the Coordinator provides an alternative perspective regarding the definition of applied research: "A different definition of applied research could have been the term 'management'." This statement suggests that a potential reinterpretation or supplementation of the term "applied research" might be found within the realm of management, although details or specific reasons for this position are absent within the interview context.

A critical point that is highlighted pertains to the image and reality of VET (Vocational Education and Training) schools: "In vocational education and training schools, relations between learners and trainers are most of the time impersonal, and trainers do not provide the help learners need." The communication between trainers and trainees is often unsatisfactory, and "the trainees do not have knowledge of the research." This raises questions about the integration of research into curricula and the development of supportive relationships within the training process. The Owner of a SME emphasizes that "today's vocational training schools have to arouse the curiosity and enthusiasm of the trainees." It is noteworthy that the appeal and enthusiasm for VET training are significantly influenced by how trainees engage with companies and the practical-oriented environment. This experience provides them insights into "the environment, the way they operate, and the policies they apply." Perception of VET is influenced by various factors, including cultural beliefs and educational policy decisions. The VET Tourism Student notes: "Our culture is such that sometimes vocational education is considered less than." Although he recognizes and emphasizes the value of VET, asserting that "applied research [...] could elevate VET education to the level of prestigious education," the general appreciation within society remains lacking. "An academic degree is definitely the way to go in Greece. [...] But I am convinced that employers are more attracted to a skilled worker with specific knowledge based on hands-on experience, such as the one provided in VET [...]," states the VET Tourism Student.

Despite the aforementioned challenges, the Coordinator emphasizes that applied research can be realized in educational and training institutions and that its findings can be "an innovative success." On the other hand, he observes that only a few universities are deeply involved with scientific research and familiarize trainees with its significance: "most [universities] do not teach trainees the importance of scientific research."

The attitude and engagement of trainers is another focus in the interview. It is emphasized that the trainers' intention to "contribute to the trainees in the various problems, questions, clarifications that may arise" is crucial for conducting research. The experience is based on an interaction: "The relationship between the trainer and the trainee must be two-way and they must have a strong relationship with the right foundations." The Owner of an SME underscores the importance of active student participation in their education. The view that students should play a proactive role in their learning experience was presented and he emphasizes that "the same should happen with the student-trainee, i.e., he should ask for the help of the teacher where he is struggling, and the teacher should do his research to give a solution to the student." This reflects the necessity of close communication and collaboration between student and teacher, especially when obstacles occur in the learning process. The Owner of a SME emphasizes that "schools should promote applied research to students, highlighting the importance of research and its benefits." This includes stressing that students should learn that theoretical knowledge has practical application, and that applied research enables the creation of new knowledge, which can improve production processes or the provision of a service. Another focus is on implementing Applied Research in the curriculum. It is suggested, "schools of higher education should eliminate stereotypes and not offer trainees sterile knowledge, but everything should be experiential and practical through the friction and contact with the subject of each task." The educational approach should thus deviate from traditional knowledge transfer and instead pursue a practice-oriented, experience-based teaching approach. Regarding practice and learning methods in VET, the VET Tourism Student notes: "If scientific methods could be even remotely linked to the everyday practice and learning in VET, I believe our status as professionals would be taken more seriously [...]." This underscores the need to more strongly link research and practice to make education in VET sectors more relevant and recognized. Teachers play a central role in implementing research findings and innovative methods in vocational education. The VET Tourism Student elaborates: "VET schools need to pick their teachers carefully and focus on the professionals that can really lean on this innovative and fact-based approach to competence." He also emphasizes that teachers should guide their students through systematic problem management and thus shape them into reliable professionals. However, they also need support at the political level: "The State needs to not only encourage but require VET teachers to regularly upskill and update their knowledge and methods." Changes in the system can often take place slowly, the VET Tourism Student notes: "because in our country, sometimes systems take decades to change [...]." Nevertheless, there is a clear demand that the state should not only encourage but require the regular further education of VET teachers.

Partnerships with associations and research centers are described as "essential for a better result," emphasizing the importance of collaborations and networking within and outside the education sector. Interaction between companies and educational institutions is also relevant: "it is necessary for the company to contact schools of further education when it needs help to solve a problem." This highlights the importance of research and development in the context of problem-oriented learning and problem-solving in companies. Among the recommendations of the business owner is a reciprocal, mutual exchange between trainers and companies. "The relationship between companies and trainers must be a two-way street."

It is pointed out that companies should present their problems to trainers, and the latter should then conduct research to find solutions that can subsequently be implemented by the company. A specific focus from the VET Tourism Student is on the tourism industry, which is of great economic importance in Greece. Here, the student emphasizes: "In tourism, many small businesses operate in outdated ways, and I think it would be a blessing if VET graduates could come into a small business and shake things up for the better." With the right skills and necessary confidence, VET graduates could significantly contribute to modernizing small businesses in the tourism sector. Despite some existing challenges, the interview partner shows optimism regarding the possibilities VET graduates offer: "These young people have the potential to bring some fresh ideas to the table if given the chance." The connection to the labour market and the reputation in society could be further strengthened through better networking and the integration of research and practice.

The Coordinator underscores the importance of promotional policies to inform "people about the importance of research." This might concern the establishment of a research culture and raising awareness for the relevance of research both in educational institutions and businesses. Lastly, the Owner of a SME stresses the necessity of a digital platform for research in higher education schools, which should be "accessible to all." Such a platform should provide a space "where thoughts and ideas from all can be presented." Furthermore, it should ensure anonymity and let all parties (school-business-student) interact and exchange ideas for future possibilities.

3.4 Italy

The manager emphasizes that the interpretation of applied research is contingent upon corporate comprehension: "Some nuances may depend on how the company interprets applied research." He also highlights a pronounced disparity between academic and industrial applied research with respect to the Technology Readiness Level (TRL). "Academic applied research may reach a TRL of 4 or 5 at most, which is utterly insufficient for the same applied research in an industrial context because the technology must be as ready as possible for use within reasonable timeframes." The Italian professor articulates: "I substantially concur with the definition you have identified for applied research," adding that this type of education, which demonstrates a robust application of applied research, typically forms the foundation for the development of learning units in Vocational Education and Training (VET). The Pedagogical Researcher refers to the term "Ricerc-azione," a fusion of "Research" and "Action," which is prevalent in Italy's pedagogical literature. She elucidates: "According to my background, I agree with the definition of 'applied research' that you have identified," further noting that despite her rich background in research, there exists a deficiency in the application dimension, motivating her return to teaching. The expert underscores that in Italy, there persist "enormous problems" concerning teacher training, particularly a lack of “teacher awareness in his continuous training path.” She also stresses the necessity for teachers to “have the tools to question and develop the different training approaches that allow him to be versatile and respond to the different situations of the educational context.” It is apparent that comprehensive education and ongoing professional development of educators are essential for effective teaching and the application of research in pedagogical practice. A noted lack of "didactic awareness" within the teaching realm is highlighted, indicating a need

to accompany and support teachers throughout the "research-action" process. A pronounced challenge therein is to integrate "intentionality and awareness" into the pedagogical action that leads to problem resolution. The Pedagogical Researcher identifies that "the Italian school still has a lot of difficulty with applied research." A core challenge resides in the inadequate support for teachers, often unaware of the benefits and methodologies of applied research. Despite the existence of guidelines, issued by the Ministry of Education in 2012, there lacks “adequate support for 'training in real situations'.” “Have an ACTIVE Teaching,” admonishes the expert, highlighting that “transmissive teaching” has failed. While younger individuals seem to be intuitively "unaware applied researchers" and often can resolve practical problems more adeptly than adults, incorporating intentionality and awareness into the educational approach leading to problem resolution poses a significant challenge. The expert is convinced that, at least in the first educational cycle, the “educational purpose [is] distinct from the productive contexts.” However, she concurs that education should not be theoretical and teaching methodologies should be applied to "concrete" contexts. Teaching should not be exclusively frontal but must also be expressed in workgroups, laboratory contexts, and "itinerant" chairs. She emphasizes the need for a “real laboratory,” that is, the collaboration between vocational schools and businesses.

The manager's depictions also allude to the necessity of close collaboration between educational institutions and the industry. A quote elucidates this: "Applied research in VET and cooperation with schools are the way to create professional profiles shaped starting from a sufficient theoretical foundation." He clarifies that applied research is often customer-centric: "Applied research is always Client-Driven." A challenge presented to the manager pertains to the general image of vocational education: "and it seems that they were directed toward vocational education due to misguidance or clichés. We know that vocational education is still perceived as second-tier." Thus, the negative image of VET appears to pose a barrier. The Italian professor also focuses on the significant necessity for collaboration between educational institutions and businesses. She emphasizes: “therefore for a school, contact with companies and relations with the local area are fundamental.” It's crucial for both teachers and students to develop a high listening capacity and an understanding of the context to comprehend problems and translate them into actionable activities. Moreover, patience and openness from companies towards the potentially “naïve” approaches of students and teachers are required. Here, a field of tension is indicated: on one side, the necessity of collaboration; on the other, the challenge of establishing understanding and appreciation between both spheres. Considering the rapid changes in the world, the VET trainer stresses: "VET organizations must remain acutely aware of the rapidly changing world, where user and company needs are continually evolving.” Hence, it is significant to promote a culture of experimentation and invest in research and innovation to effectively respond to emerging requirements and always be a step ahead of progress.

"Collaboration with Peers" represents a fundamental aspect for the VET trainer. In collaborating with like-minded individuals, such as the dialogue with CIOFS-FP Piedmont, an organization that had already successfully initiated similar activities, he sees valuable insights and orientation: “Collaborative efforts with counterparts, such as the productive dialogue with CIOFS-FP Piedmont, provided valuable insights and guidance.” This underscores the

relevance of exchange and collaboration between various organizations to benefit from existing experiences and knowledge.

Not only the trainers but also the trainees themselves play a pivotal role in the established model. "Students must be willing to do more than what is required, to go beyond the minimum task. Proactivity in finding solutions and gradually developing independence," conveys a clear message concerning student attitude. If the students are not willing to make efforts and utilize their resources, "every revision of the educational system, programs, and political support is destined to fail." Despite the great potential, the intertwining of schools and companies harbours risks. The acknowledgment and implementation of Applied Research in schools often only occur through “the sensitivity of some 'enlightened' teachers and school managers who have the will and the capacity to make it happen.” On the other hand, the professor reveals that it does happen that “students who unknowingly worked on educational applied research projects have found effective solutions which the company would never think of”, which underscores the marvellous possibilities of such collaborations. Compared to traditional educational pathways, VET demands significantly higher costs and resources, as technology, materials, student mobility to companies, and the often more vulnerable student population must be considered. “VET requires technology, it requires materials, it requires student mobility towards companies, it has students who often represent the most vulnerable range of society,” the professor highlights.

The statements emphasize the essential role of teachers in the application and conveyance of applied research. "Being good technicians is not enough to be equally good mentors," sheds light on the necessity for additional competencies for educators. Moreover, it is suggested to offer teachers further training that enhances both their research and pedagogical skills: "A corporate trainer should have skills of both a researcher and a trainer." In this, the manager also sees a need for support regarding soft skills, communication, feedback management, and teamwork. The teacher plays a complex and strategic role, particularly concerning the approximation between theoretical instruction and practical application in a professional context, asserts the Italian professor: “The key to success lies in the delicate balance and the link between teaching professionalism [...] and the professionalism of the productive context,” according to the professor. However, there often exists the risk that one of the two components of professionalism dominates and “suffocating the energy dedicated to teaching.” Furthermore, he emphasizes that teachers, to successfully traverse didactic paths of Applied Research, should themselves have a vocation as “applied researchers.” Additionally, the Pedagogical Researcher points out that “the method of recruiting teachers does not work” and that “the entire educational chain must dialogue more.” Cooperation between various educational institutions and professional associations plays a pivotal role in this. To enhance the quality and effectiveness of the teaching profession in Italy, the Pedagogical Researcher highlights the necessity of improved teacher skills verification during the recruitment process and underscores the need for teachers to act out of vocation.

The manager introduces an idea regarding digitalization in vocational education with a web-based learning approach and platforms for businesses and schools. Here, companies can post their challenges, to which schools can respond with cooperation offers: "Platform where

companies post their challenges to which schools can respond by applying to collaborate on company projects in an international exchange logic."

The VET trainer emphasizes the central importance of a mandate from regional authorities: "A pivotal catalyst was the binding request from the Region, which compelled us to invest resources and engage in research related to this innovative training approach." The regional requirement to invest resources and engage with research regarding innovative training approaches acts as a crucial catalyst to move VET organizations to grapple with the constantly changing requirements and circumstances. Additionally, the VET trainer underscores the necessity of dexterity in seeking external financial resources, such as grants and financing opportunities, to enable the exploration of innovative research pathways beyond the organization's budgetary constraints.

The Italian professor demands that politics, especially at the European level, advocate more strongly for VET paths and provide more support in implementing policies and "applied policy." Furthermore, he stresses that it is necessary to empower teachers to apply and test new teaching methods and raises the question of whether the school system has the financial means to update the skills of its staff. The VET trainer suggests minimizing dependency on external consultants for research and innovation to avoid exhausting the internal pool of experts. He elaborates: “External consultants often come at a high cost and may not possess the intimate understanding of VET that internal trainers or collaborators do.” This approach is meant to ensure that the internally available competencies and specific knowledge about VET do not get lost in the research and innovation process.

3.5 Spain

The Managing Director of Spain initially expressed uncertainty and discomfort regarding the concept of "applied research" within the realm of vocational education and training (VET). This individual was not acquainted with or comfortable with the notion of 'applied research in vocational training.' He comprehends "applied research" within a university context, where "intellectuals [are] in pursuit of the latest advancements by initiating projects that are innovative, exploring solutions that have hitherto been unseen." However, as the term was further clarified through specific examples, he gained a deeper understanding of the concept and was able to elaborate on some conducted projects more precisely. Moreover, the Head of Studies for Vocational Training and the Pedagogical Director, after initial ambiguity concerning the term "applied research in VET", proposed their own interpretations and preferences for naming this concept. The Head of Studies for Vocational Training stated: "I would prefer to call it 'implementation of innovative solutions'", as he believes this expression more clearly conveys the purpose of seeking and applying new and effective approaches to problems. Conversely, the Pedagogical Director would describe it as "challenge-based learning," a concept proposing that "students are confronted with real challenges and problems, and through research and application of solutions, they acquire skills and knowledge in a more effective and practical manner." The General Secretary holds a distinctive perspective on the concept of applied research in vocational education. Initially, he perceived “Applied Research” merely as a term applied exclusively within a university environment. However, upon closer inspection, he realized that it indeed pertains to adapting

vocational training to the specific needs of companies. “Once the concept was explained to him, he reflected upon it, internalized it, and acknowledged that it is actually about adapting vocational training to meet the specific demands of companies.” The General Secretary suggests more aptly naming the concept "Aligning Vocational Training with the reality of the company" since it pertains in practice to an approach that is oriented towards practical work and employment.

The Pedagogical Director has noted that the image of vocational education has changed significantly: "Companies are beginning to recognize the high level of skills acquired by vocational training students, which has led them to value them very positively." The approach of VET, to provide technical knowledge and a quicker entry into the professional world compared to university courses, is increasingly perceived as a positive option.

The success of the projects in the field of vocational education has been significantly driven by "the commitment to the active participation of the companies," according to the Managing Director Spain. Both students and teachers benefited significantly from the introduction of tools and solutions from the 4.0 sector into the educational field.

While vocational education is positively perceived and projects are successful, the Managing Director Spain also sees challenges and opportunities for improvement:

- Adaptation to Corporate Reality: "the need to adapt the training itineraries, contents, and methodologies of vocational training to the business reality."
- Collaboration with Universities: "a greater rapprochement between universities and vocational training centres" should be promoted to combine the research strength of universities and the corporate proximity of VET centres.
- External Tutor: The Managing Director highlights the importance of an “external” tutor, who knows and responds to the needs of all participants in the training process. Unfortunately, a project showed that "once the public funding ended, the figure ceased to exist", which questions the sustainability of such an approach.
- Resource Equipment: To promote Applied Research in VET, the Managing Director Spain deems it necessary that all VET centres "have the same technical resources", as there currently exists a substantial discrepancy in resource equipment between various centres.
- Proactive Teachers: A proactive attitude and greater engagement from VET teachers, who search for new resources, innovations, and adjustments to technological developments, are crucial in achieving significant advancements in education.

The Pedagogical Director and the Head of Studies for Vocational Training emphasize that enhanced collaboration between vocational training centers and businesses is essential. The Pedagogical Director elucidated the importance of "ensuring that companies are facilitated in bringing their realities and challenges closer to educational centers." Conversely, the Head of Studies for Vocational Training highlighted the crucial aspect of preparing today’s students for tomorrow and supplying businesses with well-trained specialists, "who are adept at effectively meeting market demands." The General Secretary points out that despite a clear shortage of skilled workers in the metal sector – particularly in areas such as welding, electricity, heating, and air conditioning – the number of students enrolled in corresponding VET courses is

inadequate. "The number of students enrolled in vocational training courses [...] does not at all meet the demand for qualified professionals required by the companies." The fundamental problem identified here is insufficient adaptation of vocational training to the needs of businesses. "Nowadays, vocational training is not adequately adapted to the needs of companies." An example of this misalignment is provided in relation to VET institutes that teach within the automotive cycle yet lack resources like hybrid or electric vehicles. The insufficient linkage between businesses and VET centers is a core issue, recurrently emphasized by the General Secretary. "There is a lack of connection between companies and VET centres." The role of teaching staff is also pivotal to tailor training course content to business needs and to continually update them. "These teachers must be constantly updated [...] to incorporate these new developments into the training courses they teach."

Both the Pedagogical Director and the Head of Studies for Vocational Training accentuate the central role of teachers. "Teachers play a fundamental role as intermediaries and guides for the students. Their accompaniment and support are essential to guide them in the learning process", is the shared conviction. The Pedagogical Director also believes that teachers could benefit from experiences within companies: "teachers would be more connected to the working environment and could enrich their knowledge and experience to pass on to their students." "It is vitally important to align VET curricula with the daily activity and needs of business. This is the only way to achieve greater efficiency", emphasizes the General Secretary. The adjustment allows businesses to have better-prepared and qualified specialists, and therefore, addressing this issue through applied research in Vocational Training is crucial. Here he underscores that it is of paramount importance that teachers are motivated and willing to undergo further training and learn new technologies. Furthermore, there is a need to update equipment to the latest technological standards. "The most important thing is to focus on teacher training and to invest in equipment that includes the latest technologies."

The necessity to streamline bureaucratic processes and adequately resource educational institutions was particularly highlighted by the Head of Studies for Vocational Training: "there is a problem of limited resources and time at schools, which makes it difficult for them to participate in these initiatives as often as they would like." He also argues for an extension of training cycles since "the level of knowledge acquired in a period of only two years is insufficient." Both also advocated for an increase in school staffing to improve teacher-student ratios and for sufficient financing and economic resources to purchase adequate equipment. Additionally, the Head of Studies for Vocational and the Pedagogical Director underline that "the willingness and enthusiasm shown by both the companies and the students were essential for the successful completion of the projects."

The General Secretary identifies a specific challenge in integrating smaller companies and micro-SMEs into dual vocational training, as hiring individuals solely for the role of company mentors is difficult due to limited resources. "In the case of small companies or micro-SMEs, this task can be more complicated due to their limited resources and small staff." One solution might be designing a company mentor profile that is shared among several companies through associations or clusters.

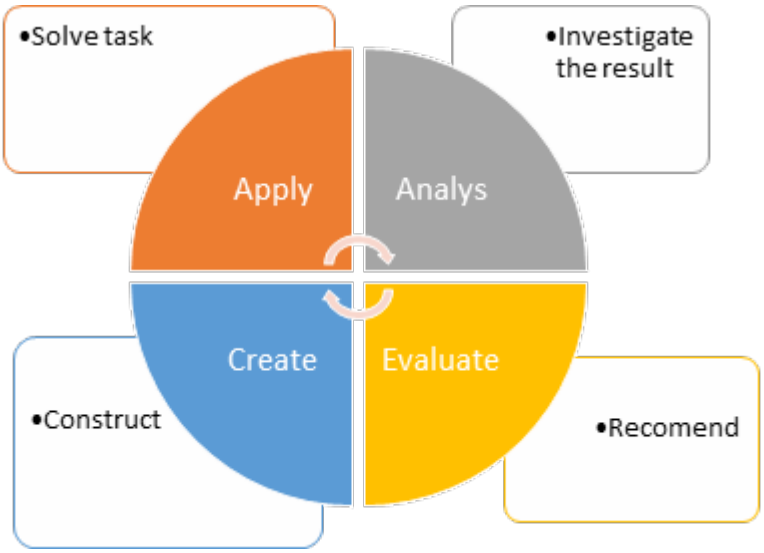
In the context of digital communication platforms, the Managing Director Spain expresses significant scepticism: he does not believe in Platforms for digital collaborations and sees personal relationships as more effective for exchanging ideas and creating solid partnerships. The Head of Studies for Vocational and the Pedagogical Director see things differently. Both interviewees are convinced that digital hubs should be effectively disseminated to promote applied research in vocational training by making them known to both companies and educational centers and enabling full interaction between them. "Its success will be achieved by establishing a close and accessible environment for all stakeholders", is a key insight they share. The continuous role of clusters or chambers of commerce as a connecting element between companies and educational institutions is also emphasized.

3.6 Sweden

In Sweden, all participants agree with the definition of applied research in VET as research that focuses on solving practical problems. However, they think it is too general and not contributing to its development in VET.

The Students in the interview wanted to redefine it as “approaches to problem-solving by innovatively applying various knowledge.” They see applied research as an educational journey from:

- Acquiring knowledge
- Understanding knowledge
- Apply it in a realistic environment
- Investigating and analysing the result
- Evaluating and recommending an application
- Creating and constructing a new application



The teachers defined it as the inclusion of new knowledge areas, such as digital literacy for problem-solving and using innovations in working life. They emphasized the applied research

for teachers and trainers in VET as a process of inclusion of new knowledge based on innovations in the sector and their impact on the teaching process and content, such as:

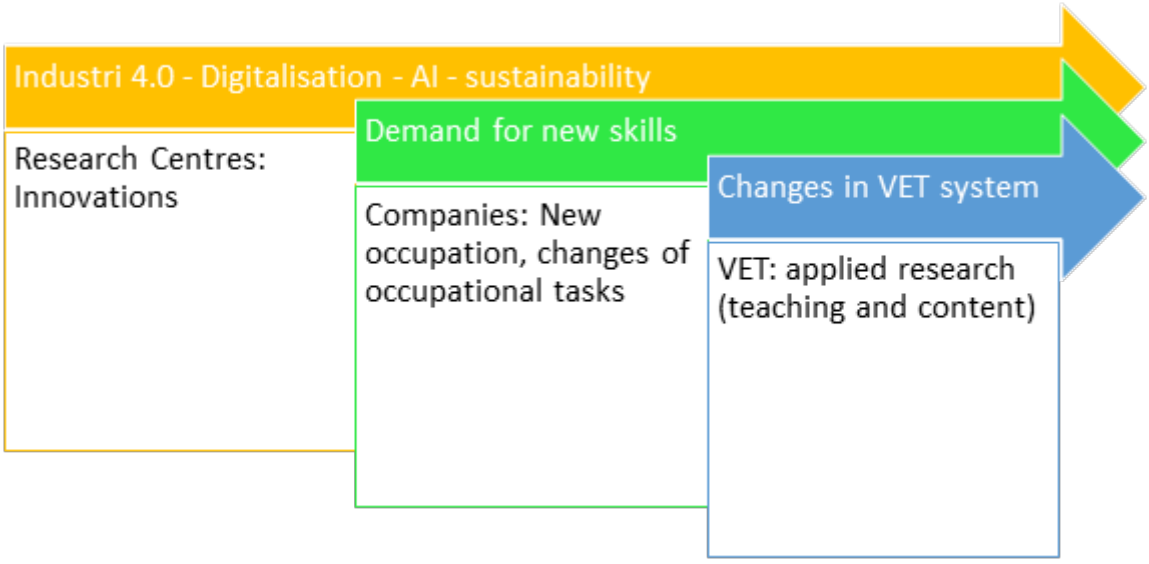
- Collaborative learning
- Problem-based and project-based learning in the work environment
- Digital learning

New work methods and new technologies are changing more rapidly. This development considerably influences the design and delivery of CVET, Upskilling, Reskilling and Lifelong Education. Learning interventions are now being delivered in the flow of work activity in an environment of digital technologies focusing on content curation. Learners must remain the focus of design and delivery, shifting from 'done to' alternatives to 'available to' resources.
The above aspects in new approaches to teaching and learning require that teachers use more research approaches than before.

The participating teachers conclude that Applied Research in teaching CVET can be defined as a process where teachers apply:

The employers point out the ability of the graduates to understand innovation and solve challenges they create in companies. Employers emphasized the need for VET graduates to evaluate different solutions and select the proper one in the construction sector.

To summarize the three groups' understanding of applied research in VET, each expressed their needs regarding innovations such as industry 4.0, digitalization, AI, sustainability, and other aspects. Further, they defined the impact of these innovations and the demands for new skills the VET system must provide.



In general, all the participants agreed that higher VET in Sweden enjoys high prestige. The employers appreciate it since it is focused on the need of their companies for skilled labour, and they are involved in developing the curricula. They can influence the training through their participation in the program management board. The students/learners find it attractive since 85-95 % get employment directly after their education.

The students think higher VET is a good education because of the employment opportunity and possibility for carrier mobility. However, the selection of the program is based on:

- Carrier possibilities
- Occupational prestige
- Level of salary
- Some of the students said that they had a higher academic degree; however, they could not find the jobs they wanted. That was the reason they applied for higher VET to be employable.

The teachers also highly value higher VET. As the main reason, they argue that most of them are coming from the involved business, so they are practitioners. They have the latest edge knowledge from the sector. The VET institutions provide them with intensive pedagogical training. They feel very engaged since most students/learners have consciously chosen education and are therefore motivated. Since a management board leads each program with most employers, they get excellent and fast feedback on the training program.

However, they also mention some challenges regarding the image of VET:

- The management of the VET institution is too focused on “pleasing the VET Authority because of budgetary issues.
- Too many bureaucratic rules regarding reporting take too much of the teaching staff’s time and focus.
- Student guidance needs improvement to develop their research competencies faster.

The employers also have a very positive attitude towards VET. The main reasons are:

- The training programs are based on the regional needs of the employers.
- Employers are directly involved in curriculum development.
- Employers can influence the training quality through a program management board.

The general opinion is that applied research in VET can address the challenges employers meet in their organizations; however, it is more than one way or simple.

The students report that in higher VET, they finish their education by carrying out a project based on a real problem in a company. One of the students mentions her project in a big regional company. She noticed that a big regional company has a vast product export volume to many countries but not Latin America. The reason was that they did not have a Spanish-speaking person to carry out marketing research. She managed to do it, and then she became head of the department for Latin America.

The student highlights teachers' use of project-based teaching and collaborative learning as the main factor. These factors are essential for developing the student's ability to conduct applied research in companies.

The teachers emphasize that the rapid pace of innovations in the working world puts pressure on VET regarding content and teaching approaches. This development requires that students' competencies are developed towards a higher level of collaborative learning, more research-based learning, especially using digital technology. This means the teaching staff must raise their knowledge level in those areas. One area is the development of teaching material which requires a kind of applied research to curate new content; this is a huge challenge according to teachers. Another change is the relationship between teaching staff and applied research centres developing innovations. Communication channels must be created to transfer information from the research centres to the VET sector.

The participating employers addressed the need for new research skills among VET graduates since Industry 4.0 requires problem-solving competencies. They think digital competencies and creativity are the two most needed competencies that promote students'/learners' ability for applied research concerning employer's needs.

Referring to personal experiences with Applied Research in Vocational Education, students elaborate that Work-Based Learning (WBL) is mandatory in courses leading to a qualified university degree, corresponding to an education at EQF levels 5 and 6 and in education leading to a polytechnic degree. The goal of WBL in higher VET is to qualify the learner to act very professionally in their occupation immediately after training. Three phases of WBL are gone through: initially, getting to know the professional field is central, followed by a middle WBL, which tests the application of theoretical knowledge in practice, and finally a WBL defined as applied research, in which students must carry out a project based on a real problem in the workplace. Four out of five students express high satisfaction with their final WBL, stating that during their 3rd WBL block, they conducted research and focused on challenges from companies involving the use of new technologies for marketing and new work organization.

For successful Applied Research, students recommend, among other things, finding a company with a clear relation to their own training, conducting thorough research, writing a neat resume and a friendly application letter, and not hesitating to apply their own knowledge and skills.

Teachers, on the other hand, share their experiences on two levels: content production and teaching approaches. They need to update their teaching materials more frequently than before due to the development of innovations and their impact on the required knowledge and skills. They also need to develop their competencies in critical curation, creation, and sharing of digital learning resources, promoting, and managing collaborative and project-based learning, and fostering critical thinking of learners.

Employers mainly report based on reports from company mentors who support higher VET students during their final WBL. Most tutors report that the students manage their final WBL, which is based on a real challenge/problem, in a relevant manner. Employers view the WBL period as an opportunity to give students the chance to further develop their knowledge under guidance and also an opportunity to get in touch with and test future employees. Operating a company that offers WBL also involves responsibility. The supervisor must ensure that the student receives information that meets the requirements of the applied research project during their final WBL. The student must participate in the work and be part of a work team, project, or another part of the business.

The three groups (students, teachers, and employers) highlighted project-oriented learning as the main factor in promoting skills for applied research to meet the challenges of the industry in the 21st century. Swedish vocational graduates are tasked with developing these skills, and thus the vocational school has improved its educational practices to impart skills such as critical thinking, problem-solving, communication, collaboration, creativity, and innovation. Students emphasize that numerous projects in class have provided them with the necessary knowledge and skills to plan projects based on problems and to develop critical and innovative thinking, with training in digital technologies seen as a crucial factor for conducting extensive research. Teachers underline the same factors and add that a developed relationship between teaching staff and research institutions/companies enables the transfer of innovations into the vocational program and helps to keep students up to date. Employers regard the planning of the final work-based learning (WBL) as the main factor and consider it crucial for students to first perform tasks under tutorial supervision, then perform tasks independently, and finally carry out projects with a research component and choice of solutions as well as innovative approaches, thereby promoting their professional development in the context of applied research.

Employers emphasize that vocational training must provide an essential basis that can be developed further, and that competence refers to a person's ability to act in a concrete situation. They believe they can support students by facilitating the process from vocational knowledge to development agency through applied research. It is highlighted that the process is particularly successful when the student is well-prepared during class, for which, among other things, appropriate communication between vocational education teachers and company mentors, as well as well-thought-out goals for each period of work-based learning

(WBL), agreed upon by the company, vocational training institution, and student, are necessary.

Teachers agree with employers, emphasizing the need to begin the Vocational Education and Training (VET) program with basic professional skills, progressing towards more autonomous, research-oriented abilities. To support this process, teachers should focus more on project-based teaching and engage in developing appropriate topics and training materials amid the digitization of education.

Students generally agree with both teachers and employers, identifying the relationship between the company mentor and the student during the WBL (Work-Based Learning) Phase 3 as a critical factor for developing applied research skills. It is noted that mentors sometimes do not have enough time to provide feedback on the student's research project.

The participating companies note that the rapidly increasing knowledge content in business activities is placing ever-greater demands on the ability of companies and organizations to absorb new knowledge, especially outside their core area. The time factor is becoming increasingly critical with shorter lead times. A consequence is that modularization is becoming more common in service companies (this has been the case in the manufacturing industry for some time). Applied research in companies aims to address specific business problems. It seeks data and information to develop innovative solutions that can be used to generate new products, services, and organizational structures. Regarding the need for Applied Research, it involves testing and analysing components and products, introducing new materials into products, improving the quality and performance of the manufacturing process, streamlining production, enhancing innovation capability, and making both the product and the process more energy efficient.

According to the experts, schools must promote Applied Research, with both teachers and students playing a vital role. Teachers should demonstrate pedagogical competence to ensure that institutions of applied sciences achieve the objectives of qualified vocational training. Without clear guidelines for pedagogical competence, significant responsibility lies with the education provider. Students, too, must demand that teachers' expertise be conveyed in the best possible way. Teachers' needs include advancing the role of CVET trainer, curating learning content, critical digital competence, online collaboration methods, learning design, online learning communication strategies, a competency framework for Applied Research, and using tools and materials to promote competency development and Applied Research.

Students, meanwhile, emphasize the need for educational material that supports project-based learning and Applied Research. They point out difficulties in learning independently when they miss lessons or need support going through the material. For instance, they were referred by teachers to YouTube, where videos are often in other languages, and it can be challenging to find correct and skill-appropriate information. They also highlight that independently keeping track of various tasks and submissions after missing lessons is challenging and a learning platform could be utilized more actively. In the worst case, they receive no information at all. Both teachers and students conclude that there is a need for relevant study material that promotes competencies for Applied Research.

To meet the needs of various stakeholders (companies, trainers, students, and policymakers) in the field of vocational education, students highlight several aspects: They would like better and earlier involvement of companies in the initial phase of the vocational training program, conducting projects based on real problems at least after the first six months of the program, and improved digital training materials using various apps.

Teachers expressed a desire to improve their digital skills to allow better curation and mashup, more time to develop project-oriented topics using Applied Research, improved and increased contact with company mentors to receive feedback on their teaching, and the development of channels to research institutions to reduce the time lag regarding new skills for innovations.

Employers, in turn, emphasized the desire for better and more frequent contact between companies and vocational training institutions, the inclusion of topics exciting and needed for employers in the training programs, and a short initial training by vocational training institutions for company mentors to be better prepared for Applied Research in the final work-based learning phase. All these points together illustrate a common direction: Closer and more effective cooperation between educational institutions, companies, and policy-makers is essential to ensure relevant, practical, and future-proof vocational education.

Students have defined their needs as follows: Firstly, they require comprehensive, specialized, technical, and theoretical knowledge within a work or study area, as well as an awareness of the limits of this knowledge. Secondly, they desire more real case studies based on companies' previously conducted projects. Thirdly, a broad spectrum of practical skills is necessary to develop creative solutions for abstract and practical problems in the form of projects. Fourthly, they wish for better support in exercising self-management within the framework of work guidelines. And fifthly, advanced skills should be offered that are required to demonstrate mastery and innovation to solve complex problems in a specialized work or study field. Summarized in a continuous text: The students define their needs for a combination of deep theoretical knowledge of their subject area, practical skills supported by real case studies and project work, effective self-management, and advanced skills that demonstrate innovation and problem-solving in their specialty.

A Platform for Digital Collaboration for training Applied Research Skills in VET (Vocational Education and Training) competence should fulfil several key functions: Firstly, it should provide a platform for collaboration with education providers to support competency development and skills at both a basic and advanced level of Applied Research in VET education. Secondly, it should act as a bridge between the private, public, and VET sector, as well as research institutions. In this role, it should work closely with Applied Research Centers, VET institutions, and universities to develop customized training programs in innovation and related Applied Research based on digitalization that meets current and future labour market needs. Thirdly, it should organize various events to enhance the skills for Applied Research in VET institutions and their teaching staff. These formats can range from traditional workshops and seminars to interactive hackathons, study visits, and "Failure Sessions". The topic of the event should be based on current needs and be adaptable for both beginners and experts

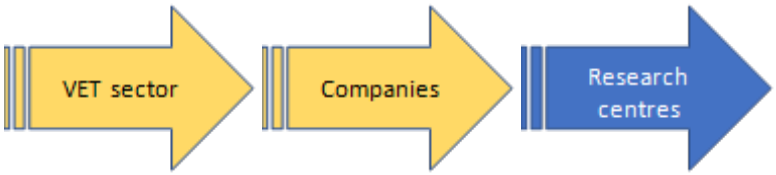
(depending on the topic). This ensures that the Platform for Digital Collaboration effectively acts as a mediator, collaborator, and innovator in promoting Applied Research within the VET landscape.

Based on the above interview session, the Swedish Team had a 3-hour-long discussion with administrators of Higher VET in Folkuniversitetet in 4 cities (Uppsala, Gävle, Västerås and Falun).

They came to the following conclusions:

To support Applied Research, we must build and strengthen the communication channels between research institutions and VET centres. Instead of waiting to transfer information and knowledge from business to the VET sector, which creates a time gap, we must have a direct channel between VET and research centres.

Traditional structure



21st century structure

Applied Research in VET requires VET teaching and learning to be based on:

- Project-based learning, digital literacy and digital critical knowledge
- A competency journey for students from perceiving to using to selecting, to acting independently, to innovating
- A teaching staff with proactive contact with research centres for innovation and enterprises
- Teachers having competencies in content curation using digital media,
- themes to support learning and performance
- Finding and filtering the best information,
- Explaining the relevance or providing context for the curated content

4 SUMMARY RESULTS OF THE QUALITATIVE INTERVIEWS

Within this section, the findings procured from the qualitative interviews are filtered, succinctly synthesized, and analysed. A focused exploration of themes that have prominently surfaced across all interviewee interactions is presented. Peripheral comments, posited by singular interview participants and supposedly lacking substantive relevance, have been selectively omitted from the primary analysis. Nevertheless, summative synopses of all interviews are duly included within the appendices for comprehensive perusal.

4.1 Definition of Applied Research in Vocational Education and Training

At the outset of the interviews, participants were presented with a succinct definition, as understood by the NEARVET-Consortium for Applied Research in VET (Vocational Education and Training), to establish a foundational basis for the discussions. Simultaneously, participants were encouraged to comment on this definition, expressing whether they shared this viewpoint, had anticipated it, or if other thoughts occurred to them. This approach acknowledged observations from the literature review, which clearly indicated that the term "Applied Research in VET" is understood and defined variably.

Even amidst the participants of this study, consensus is notably absent regarding the suitability of both the definition and the deployed term "Applied Research in VET" (Vocational Education and Training). Two participants from Spain opine that applied research should be a domain exclusive to universities: *The General Secretary initially thought that this term referred exclusively to the university environment.* Similarly, *the Managing Director believes that this concept of "applied research" is typically conducted within universities, not in training centers.* This notion is paralleled by a *VET tourism student* from Greece, who perceives it as something that *"sounds more related to academics, not vocational education."* Conversely, a *former principal* of a German vocational school expresses discontents with the adjunct "applied," asserting that research, by its nature, should inherently be applied. Participants from Sweden, Spain, and Cyprus harboured divergent associations and conceptions regarding how the realm of Applied Research in VET might be more lucidly articulated: *"So, the term innovation is something that would find much easier ground, because most HR and most employers and employees are interested in innovations and things that they can implement and that they can get better with on an individual or even a collective level. So, I think the catchiest term is innovation,"* asserts the *Head of Training & Development and Human Resources* from Cyprus. The Spanish *Head of Studies for Vocational Training* Cycles also engages with the term innovation. He noted that he would prefer to call it *"implementation of innovative solutions".* In his perspective, this phrasing could more transparently convey the intent of identifying and deploying innovative and efficacious approaches to problem resolution. The Spanish General Secretary proposes, from his standpoint, that this concept might be more aptly termed *"Aligning Vocational Training with the reality of the company"*, owing to the pragmatic and work-oriented approach of the enterprise. The *Swedish students* sought to recharacterize it as “approaches to problem-solving by innovatively applying various knowledge.” They envision applied research as an educational voyage through:

a. Acquiring knowledge.
b. Understanding knowledge.
c. Applying it in a realistic environment.
d. Investigating and analysing the result.
e. Evaluating and recommending an application.
f. Creating and constructing a new application.

The *College Director* from Cyprus finds the definition presented by the research group to be unintelligible: *"We need to make the concept more understandable, because if you're dealing with more professional fields, you want simpler terminology. (...) It would be easier to have a more understandable term, so that it would be easier to understand the skills needed in this category."* Similarly, the *Head of Training* from Cyprus finds the terminology to be not comprehensible: *"naming, I would give a different name to this type of research that focuses on solving real-world problems, but it wouldn't be a single word, maybe it would be something more descriptive: 'Linking vocational training curricula to the market'."* The interviewees from Spain also struggled with the terminology. However, another phenomenon emerged here: *once one interview partner understood what the concept was all about, she said that it is something that is already being integrated into her school's day-to-day life.* This clearly shows that some of the expert respondents are already practicing Applied Research in VET without being consciously aware of it or even summarizing it under this terminology. *The Pedagogical Director* would call it *"challenge-based learning,"* a concept that suggests students are confronted with real challenges and problems and, through research and application of solutions, acquire skills and knowledge in a more effective and practical way.

The teachers from Sweden defined it as the inclusion of new knowledge areas, such as digital literacy for problem-solving and using innovations in working life. They emphasised the applied research for teachers and trainers in VET as a process of inclusion of new knowledge based on innovations in the sector and their impact on the teaching process and content, such as:

a. Collaborative learning
b. Problem-based and project-based learning in the work environment
c. Digital learning

Additionally, they referred to the final WBL (Work-Based Learning) in Sweden, where students *must do an actual project based on a real problem in the workplace.*

Other interviewees, however, find the terminology and definition to be suitable. The *Managing Director* from Cyprus states: *"In relation to terminology, I wouldn't give applied research any other name. I think applied research by definition gives exactly the stigma that is needed."* The term applied research is also regarded as fitting and appropriate by an expert from Germany, as the application plays a vital role in the context of research. He would not choose another term since the cooperative universities, with which he has worked for decades, also use the term applied research. From his perspective, this is a well-established term and should therefore not be altered. The *Italian Professor* agrees: *"I substantially agree with the definition you have identified for applied research. This kind of teaching, with a strong application of applied research, is the one which is normally at the basis of the construction of*

learning units in VET." The Italian *VET trainer* states: *"Based on my background, I wholeheartedly endorse the definition of 'applied research' you've provided."* It is noteworthy that those respondents who have enjoyed a university education and/or are active in this context have significantly fewer issues with the terminology Applied Research in VET. For the German *Vice President*, applied research is a type of research in which the results find direct applications in industry. It is not intended to confirm or challenge theories but to generate solutions directly in different industrial application areas. Therefore, he considers the term to be very fitting. Whether the term "applied research in vocational training" is actually the right approach to take everyone on this path due to the reservations of some interviewees remains an open question and is also discussed the NEARVET Methodological Concept by Richard Parkes (Parkes, R. (ed.) et al. (2023), 'Network for Applied Research in VET: Methodological Concept Study', NEARVET).

In moving towards a definitive definition, the advent and establishment of ARRIVET (Applied Research Results in Vocational Education and Training) should be noted.
This is announced as being *"an international, interdisciplinary publication dedicated to the documentation and dissemination of applied research results. Its focus is on the application of research to the solution of business and industry problems and the use of applied research in vocational learning and teaching".* (https://arrivet.org/index.php/arrivet/about).
It has an editorial board that features various stakeholders including representatives of Tknika, the Basque VET Applied Research Centre referenced in this Study. (https://arrivet.org/index.php/arrivet/about/editorialTeam) Stated on its website as being due to launch in February 2023, it does not yet list any publication. Nonetheless, the evidence identified thus far through present sources and the analysis of the above leads us to the conclusion that we can concur with the definitional statement made ARRIVET from which the NEARVET concept can be developed further, specifically ***"Applied research addresses any person who is interested in solving practical research problems of business and industry, with particular focus on those committed to the dialogue between production and instruction, the professional and the vocational."*** (Parkes, R. (ed.) et al. (2023), 'Network for Applied Research in VET: Methodological Concept Study', NEARVET), 69-72'

4.2 Image of Vocational Education and Training

The consortium discussed to what extent the image of vocational education and training in the respective partner countries can be seen as a possible risk or even an opportunity for the implementation of Applied Research in VET. Here, the responses of the interviewed experts revealed country-specific nuances. Germany, and to some extent Greece, stand out as countries where the image of VET appears to be significantly worse than in the other countries examined: According to the *Vice President*, the image of vocational training in Germany is steadily declining. An increasing number of parents aspire for their children to pursue a university education. A *former principal* of a vocational school also believes that in Germany, university education "clearly takes precedence". The needs of young people have changed significantly, and training companies are not adapting to these altered demands. There is a need for training companies where people are available to address the concerns of young people, possess pedagogical skills, and treat them with respect. Furthermore, it is essential to

ensure that academic and vocational education are perceived as equal in the minds of people. The *German Professor* also sees a poor image for vocational training in Germany, arguing that the majority of young people nowadays prefer to study at a university. He laments this, adding that it is the reason for the over 60,000 students dropping out annually. However, demand for dual training is higher than for conventional training. Only one interviewee, not from Germany or Greece, perceives the VET image negatively: The *Automation & Engineering Manager* states: “and it seems that they were directed toward vocational education due to misguidance or clichés. We know that vocational education is still perceived as second.” The Greek *VET Tourism Student* says that “an academic degree is definitely the way to go in Greece. Our culture is such that sometimes vocational education is considered less than. But I am convinced that employers are more attracted to a skilled worker with specific knowledge based on hands-on experience, such as the one provided in VET, and so the job market probably doesn’t follow this antiquated mindset of Greek parents and school teachers that favours academic education.” The Coordinator from Greece adds: “In vocational education and training schools, relations between learners and trainers are impersonal most of the time and trainers do not provide the help learners need. Communication between them is not very good, so the trainees do not have knowledge of the research.“ The *Owner of an SME* notes: "Today's vocational training schools have to arouse the curiosity and enthusiasm of the trainees. In order to achieve this, the trainee should come into live contact with the company to see the environment, the way they operate, and the policies they apply."

In Sweden, all interviewees agree that higher VET enjoys high prestige. The *Managing Director from Spain* also believes that the VET image is “very positive and with a promising future.” The *Pedagogical Director* supposes that the image of vocational training has changed significantly compared to what it was a few years ago. Companies are beginning to recognize the high level of skills acquired by vocational training students, which has led them to value them very positively and to give them opportunities to carry out their training stay with them, either in the form of Workplace Training (FCT) or as dual VET, which allows them to improve their chances of finding employment. In Cyprus, the situation is viewed positively: “I think that the situation in Cyprus at the moment is at a very good level at the moment and people are interested in being trained and interested in acquiring practical tools that are of great interest to them.”

4.3 Prerequisites for the Implementation of Applied Research in VET

A focus of the interviews was on determining the prerequisites that must be established to integrate Applied Research in VET (cf. Parkes, R. (ed.) et al. (2023), ‘Network for Applied Research in VET: Methodological Concept Study’, NEARVET)). In the interviews, several attention areas were described, which were initially coded and subsequently summarized into categories. The following subchapters more or less correspond to the categories formed and highlight the different areas of attention.

4.3.1 Requirements for Policy

In the context of Applied research in Vocational Education and Training (VET), the focus lies on the necessity for strategic, political, and systemic support to create optimal conditions for the conduct and implementation of Applied Research in VET. Based on the insights from various interviews with experts and stakeholders from different countries within the EU for this research project, a differentiated analysis will be undertaken in this subchapter.

Initially, the structural dilemma of system changes is emphasized, which sometimes progress slowly and are not implemented promptly enough to utilize full potential. The *VET Tourism Student* describes it for Greece as follows: "because in our country, sometimes systems take decades to change." The statements of the *German Professor* and the *Head of Studies for Vocational Training Cycles* from Spain underline the need for a policy that addresses the timeliness and dynamics of labour market requirements, especially with regard to the relevance of speed and flexibility. In a time when the demands of the labour market and the requirements of companies change almost hourly, politics is too little agile to be able to respond in an appealing way.

The emphasis on the need for strategic planning and a developmental guideline is evident, with clear pillars and priorities at the national level, as found by the *Managing Director* from Cyprus. Consensus-oriented policymaking, developed through extensive consultations with all stakeholders, should ensure a realistic and widely accepted strategic direction. This integrated approach will not only provide a clear direction for national development but also ensure the cooperation and engagement of all relevant actors.
The importance of involving the private sector and industry in the development and implementation phase to ensure real practical relevance was also emphasized by the *Managing Director* from Cyprus. In addition, it is essential that policy and practice are interlinked, and that political decisions and research activities are closely linked with the real circumstances and challenges of the labour market, according to the *Head of Training*.

It was clearly stated that financial support and incentives from policy makers are indispensable to promote and sustainably support innovations and Applied Research in Vocational Training. This is particularly relevant to promote innovative power and development potential within Vocational Training Institutions and ultimately to increase competitiveness.

Another key aspect is the continuous qualification of VET teachers to ensure the quality and timeliness of the content conveyed (see also chapter 4.3.3 of this work). The demand for an adjustment and expansion of the curricula as well as an improvement of the teacher-student ratio was also addressed in order to deepen not only theoretical but also practical and application-oriented knowledge.

In summary, it becomes apparent that multiperspective, intersectoral, and practice-oriented policy development and implementation are crucial to effectively enable and promote Applied Research in VET.

4.3.2 Teacher Competencies and Attitudes

Applied Research in VET schools demands a certain degree of attitude and capabilities from teachers. Statements collected from the interviews light on the critical aspects of teacher attitudes and competencies in relation to the implementation of Applied Research. A consistently proactive stance and a pronounced commitment from teachers appear to be essential for the success of Applied Research in VET Programs. The *Managing Director* from Spain emphasized the immense importance of a "proactive attitude and greater commitment from VET school teaching staff" and its impact on "significant progress in education." Similarly, through the quote from the *Manager* from Italy, it was noted that teachers who "mobilize their passions and motivations" are able to pursue an approach that is "certainly more demanding than traditional teaching."

It was pointed out that, in addition to pure technical expertise, "relationship learning and a willingness to change" are particularly important for teachers, as described by the *Former German Vocational School Principal*. The idea that "teachers should also be 'researchers' themselves: enthusiastic, proactive, curious, understanding," as the *Italian Professor* thinks, was also emphasized.

Teacher selection was highlighted as a critical point in various interviews, including emphasizing the “sensitivity of some 'enlightened' teachers and principals” in Italy. The *Pedagogical Researcher* from Italy suggests that there is a problem, which “in my opinion” lies “upstream” and the weakness can be traced back to teacher recruitment.
Some teachers, as observed in Italy, already show a high willingness for further education and innovation, as reported by the *Italian Professor*. While the recommendation from Greece is that VET schools “should carefully select their teachers and focus on the professionals who can truly rely on this innovative and evidence-based approach to competence.”

A central element appears to be the "support of trainees in various issues," which is viewed as contributing to conducting research. Here, teachers "play a fundamental role as mediators and leaders for students" and their "accompaniment and support are essential to guide them in the learning process," says the *Head of Studies for Vocational Training Cycles*. "The relationship between the trainer and the trainee must be two-way and they must have a strong relationship with the right foundations. When the trainee faces a problem, he must contact the trainer to find a solution through the research he will conduct, and the role of the trainer is to conduct his research and help the trainee solve his problem," says the Coordinator from Greece. According to the *Managing Director* from Cyprus, teachers should be “able to listen to the difficulties, concerns, and questions of the participants and understand them, and they must be organized, they must be able to provide the solutions they need.” Communication is central, as the *Head of Training* also describes: "Let's say, I think it's very important in our work to be quite communicative, as that's defined. But I have met people who do this job, and they are not communicative. You can see what the consequences of that can be.” He believes: “Regarding the skills that teachers need to have in order to convey 'Applied Research' to students, the first one is communication, that is to put the 'what's in it for me?' of the trainee at the center, what the benefit is for the trainee, not for the company, not for the trainers themselves.”

Despite positive individual cases, it is emphasized that “not all university trainers will support trainees and will not endeavour to solve their problems.” Another challenge is the frequent occurrence of low practicability and proactivity among teachers, as reported by the *Italian Manager*.

According to the *German Professor*, the school management should not only demand innovative thinking and dealing with current topics from teachers but should also present and demand these requirements.

In the entire discussion about the attitude and skills of teachers for Applied Research in VET programs, it emerges that both individual teacher characteristics (such as commitment, proactive attitude, and a balance of technical and social competence) and structural and organizational aspects (such as teacher selection, professionalization offers, and school development processes) are central. For comparison, also see the following chapter. Moreover, according to some interview partners, teachers should also seek contact with universities to get in touch with current research and be able to pass it on. Furthermore, the *German Professor* sees an active exchange between universities and vocational schools as a key moment. Permanent network maintenance is necessary for this. In his opinion, there needs to be a person who does this as a main profession and is responsible for it. This person should take care of contact with universities, make scientific and practical transfers. And not only in Germany but internationally. International networking and maintaining contact with other universities on similar topics are crucial and must be kept alive continuously. The Greek *Coordinator* also finds this important: “Moreover, collaborations with research institutions and educational centers are important as long as there is time and will on all sides.” The Swedish Report also addresses this: “Another change is the relationship between teaching staff and Applied Research Centers developing innovations. Communication channels must be created to transfer information from the Research Centers to the VET sector.” The *Managing Director* from Cyprus also calls for stronger cooperation between universities and vocational schools: “So I would say that the relationship with the research part is complementary. This research part could be done by a pure research organization or a university, even if we as organizations also produce research. If we say that we are the educational part, we are the training organization, then ideally a research part, e.g., a university, would ideally join us in order to give further emphasis, analysis, and quality to the Applied Research part.”

4.3.3 Teacher Qualifications and Training

Many participants expressed themselves on this topic, perceiving a clear need for action, regardless of country affiliation and independent of the professional view they have on the Vocational Education System. All participants agree that teachers need to be better educated. The *VET-Tourism-Student* believes "they need to be able to guide students through the process of learning to have a systematic way of dealing with problems, so that they can become confident and reliable professionals." The *Vice President* also notes that the most crucial point is adequate teacher training. A common hurdle is often achieving a technological breakthrough in vocational schools, which often meets resistance. His suggestion: every technological change should be accompanied by training or qualifications in vocational

training. Applied Research should be a topic and skills should be conveyed during teacher training on how content can be adequately conveyed to students. Moreover, he deems it very important that teachers acquire skills in the field of entrepreneurship. He suggests KPIs for teachers to ensure that the person is capable of providing high-quality instruction before employment (measurability). The *German Professor* also believes that the government should pay more, consistent attention - which is also important for universities - to promoting innovation. Teachers must be approved to try new things so that they do not have to constantly adhere to the curriculum. New teaching methods and current technology must be adopted. Swedish teachers also strike a similar chord: Emphasise that the rapid pace of innovations in the working world puts pressure on VET regarding content and teaching approaches. This development requires that students' competencies are developed towards a higher level of collaborative learning, more research-based learning, especially using digital technology. This means the teaching staff must raise their knowledge level in those areas. Both business and industry individuals should prioritize teachers' pedagogical competence to guarantee that the VET institutions of Applied Sciences achieve the goals for qualified Vocational Training. Without clear guidelines for pedagogical competence, a great responsibility is placed on the education provider. Most of the teachers addressed their need to upskill digital competencies.

With the implementation of Applied Research in VET, teachers need new skills: "Regarding the skills that teachers need to have in order to convey “Applied Research” to students, first of all, they have to be flexible. We are dealing with a concept which is not an everyday concept, so I have to have that way of being flexible when creating my material and also when transferring it, they must certainly be communicative," says the *Managing Director* from Cyprus. "If I, as a VET organization, am not invested in the lifelong learning of my organization, my staff, my team, I cannot expect my staff to represent me deservedly in my service offering."

The *College Director* from Greece opines: "In relation to teachers and the skills they need to have in order to do Applied Research, first of all they need to know how to do research. Understand research so they need to develop that part. They need to have an understanding of things and have digital skills because everything will be digital (data, tools, etc.). They also need to have communication. If they are trainers, they have to have communication but the appropriate communication, because there are different kinds of communication."

Also, for the *General Secretary*, the most important thing is to focus on teacher training and to invest in equipment that includes the latest technologies. “These two solutions have to go hand in hand, and for this, it is very important to keep teachers motivated and willing to update themselves and learn new technologies.” To ensure VET teachers are continuously trained and retrained, he believes educational centers should collaborate and take advantage of resources offered by public institutions like CIFPA, the new Digital Campus being created in Zaragoza to promote VET, or INAEM's Centre for Advanced Technologies in Zaragoza, dedicated to the permanent updating of knowledge in ICTs and audiovisual technologies.

The *Manager* from Italy believes that being good technicians is not enough to be equally good mentors: "I would suggest training in personnel management, knowing how to communicate with the team, managing relationships, and providing feedback. A corporate trainer should

have skills of both a researcher and a trainer. Incentive mechanisms specifically designed for this teaching method could be developed to reward the quality of teaching and adequately compensate the abilities of the teachers." There is also a need to work on the selection methods for teachers and provide tailored training programs for those teachers who have the approach and propensity to use Applied Research in their teaching. However, schools must first believe in Applied Research and provide teachers with access to enabling technology and the necessary training. The *Italian Professor's* statement goes in the same direction: "Before asking us if the teachers would be willing to update their others, we must ask ourselves if our school system has the financial availability to update the skills of its employees."

She further explains: "It is very difficult to find teachers who are able to conceive Applied Research as a didactic methodology if the teacher and the school Director experience their profession as mainly an administrative and bureaucratic job. The training of teachers and the awareness of managers in this are essential. The school should be able to organize itself within its internal awareness with respect to the set of competences it may have among the teachers, enhancing the different competences and skills of the teachers in teamwork, with an integrated and complementary approach to Applied Research." Regarding Italy, she believes that perhaps the legal status of teachers might need to be changed: "I see in schools (in the VET system, but also in non-VET paths) teachers who have not been able to keep up with the evolution of the recent years in the cognitive development of adolescents and, more generally, of neurosciences. Teachers must be enabled to test these teaching methodologies on themselves. (...) I would also like to point out that the professionalism of the teacher is one of those most often given for grants, therefore I believe that an adequate recognition (not only financial) of this complex set of skills could provide the motivation not to flatten to educational models that require little effort from the teachers." Because: Some school directors complain about the difficulty of finding good technical teachers precisely because a good technician is professionally required also by the production system, which has the capacity to remunerate competence in a more incentive way.

The interviews also make it clear that the school principal in vocational schools also plays an important role: The school principal has a central key role and should strive for continuous improvement, thus advancing school development, says the *Former Principal*. The *Italian Professor* states: "Finally, it is important to remember that the teacher is not alone, therefore the school, to promote Applied Research, must promote the involvement of the entire Class Council in 'Active Teaching' which is nothing but Applied Research."

4.3.4 Educational Concepts

The enablement and effective implementation of Applied Research in vocational education is directly correlated with pedagogical approaches. A repeatedly highlighted element in the interviews is the necessity for practice-oriented, experience-based teaching. An *Owner of a SME* from Greece stresses: *"Schools of higher education should eliminate stereotypes and not offer trainees sterile knowledge, but everything should be experiential and practical through the friction and contact with the subject of each task."* This statement aligns with the perspective of the *VET-Tourism-Student*, who notes that it's essential to learn *"the process of researching in class"* and actively experience Applied Research Methods during lessons.

The methodological orientation of the teaching emerges as a key for learning Applied Research Skills. The Swedish report underscores that both students and employers identify the teaching concept of project-based learning and collaborative working as an essential factor to develop *"the student's ability to conduct Applied Research in companies."*

Moreover, adapting and updating curricula is seen as indispensable to adequately convey Applied Research skills and facilitate the transition from the academic to the professional world. This implies that imparting basic research concepts, academic language, and critical thinking skills, as well as "soft skills", such as communication and teamwork, should become fundamental components of the curriculum, as both *VET-Tourism-Student* and the *Manager* think.

It's important to stress that this active, research-based, and practical teaching not only presupposes certain didactic skills but also a correspondingly supportive attitude from teachers. The *Italian Professor* emphasizes that successful teaching in this field requires a "delicate balance" between professional teaching and conveying the professionalism of the productive context for which the students are being trained.

The comments of the Italian *Pedagogical Researcher* offer further impetus for reflection on teaching methods and techniques: *"Teaching must be expressed in working groups, in laboratory contexts, in 'itinerant' chairs, on occasions for comparison with the environment, with others, with the territory...".* He thereby stresses the relevance of active teaching and the creation of mechanisms that initiate and lead research and reflection to results.
The emphasized necessity to train both cognitive and practical skills points to a teaching concept that intertwines theory and practice, with teachers acting as active mediators of research skills, necessary to build bridges between academic education and professional practice.

To support teachers accordingly, educational institutions must provide the necessary resources and further training, enabling them to continuously develop the required skills and knowledge to effectively prepare students for their professional future. The *Managing Director* from Cyprus thinks: "a proper training organization should first of all diagnose the needs and competencies of its people and based on the findings work on those skills that its trainers need."

4.3.5 Support for Teachers through Policy

A core element emerging from the available interview data is the demand for enhanced political support to empower teachers in the field of (VET) to successfully integrate and advance Applied Research.

A widespread consensus emerging from the interviews with experts is the demand for better financial remuneration for teachers. In Italy, for instance, the issue of lacking financial incentives for teachers compared to corporate remuneration was highlighted: *"...the salary as a teacher is not even far comparable to the company remuneration,"* describes the *Italian*

Professor of the current state. The *Vice President* from Germany describes the same, signalling the need to make the teaching profession more attractive through financial enhancement. Politics plays a crucial role in adjusting salary structures, to secure not only the recruitment but also the retention of teachers.

Social support and further training of teachers and trainers is another central point discussed in the interviews. A *Former Vocational School Principal* from Germany believes that social care for teachers is very important. The necessity of training by a training consultant who goes through the schools and companies was also emphasized, noting that this could also reduce the dropout rate. A problem in the management of VET institutions, particularly in the Swedish context, was pointed out, noting that management often focuses too much on *"pleasing the VET authority because of budgetary issues.*" This opens a discussion about the extent of administrative tasks and bureaucracy that often burden teachers.

Several contributions underscore the dilemma of limited resources and time in schools. A perspective from Spain highlights that there is a problem with limited resources and time at schools, which hampers participation in initiatives. Moreover, the Swedish report underscores the need for more time to develop project-based topics through Applied Research.

A look towards Italy reveals further challenges and solutions. Among other things, it is emphasized that it might be sensible to foresee different tasks and workloads for older teachers: *"...different assignments and workloads for older teachers...", s*uggests the *Pedagogical Researcher*. This directs focus towards the importance of supporting teachers throughout their entire professional career to ensure long-term quality in teaching.

At the same time, according to the *Former Principal* of a German vocational school, vocational schoolteachers should be obliged to do a company internship at certain intervals. Otherwise, one quickly loses touch with practical work. Additionally, she believes it is essential for several practical phases to be completed at school during studies so that prospective teachers do not stand in front of a class for the first time during their master's program.

In the view of the *German Professor*, politics should inspire vocational schools and specifically teachers more to be creative as well. Often willingness is not present. However, it is necessary because the world is changing. Thus, politics should create conditions to accelerate this process in vocational schools.

4.3.6 Business Sector

The intertwinement of Vocational Education and Training (VET) with research forms the cornerstone for a sustainable, innovative development within enterprises. VET students could play a significant role herein, serving as a nexus between theory and practice. To facilitate this, the interviewed experts also classify requirements and challenges for enterprises, which will be discussed subsequently.

A persistent motif emanating from the interviews pertained to the pivotal role of corporate culture. The *Head of Training* from Cyprus underscored that wherever engagement within an enterprise is present, there is a culture of "Yes, we are engaged", "Yes, we are doing it right". A core necessity, therefore, lies in the deliberate choice for research, since without this awareness, the process is doomed to failure and will not yield the hoped-for results, as remarked by the *Coordinator* from Greece.

A fundamental prerequisite that must be provided by the companies is the willingness to invest time. As articulated by the *Head of Training from Cyprus*, "these processes take time" and recognizing the value of the process is essential. Complementing this, the importance of patience and an open attitude was highlighted from Italy. It requires the ability to tolerate perhaps a somewhat naive attitude of the students and school leaders and, at the same time, to recognize value in the contributions of young people, according to the *Italian Professor*.

Another critical aspect running through the interviews is the emphasis on communication and supervision. Close supervision and open communication are vital to fully exploit the potential of the VET students, as emphasized by the *VET-Tourism-Student* from Greece. A regular exchange, both professional and personal, between trainers and teachers was noted by the *Former School Principal* from a German vocational school.

Also, the emphasis on a mentor during the training phase is significant, as a proficient tutor plays a fundamental role in supporting and enriching the students' experience, opines the *Head of Studies for Vocational Training Cycles* from Spain.

Innovation incentives are also a driving force to involve companies in this process, as highlighted by the *Head of Training* from Cyprus. The *Head of Studies for Vocational Training Cycles* from Spain underscores the point of rewarding the innovative spirit of employees in companies and suggests recognizing and rewarding entrepreneurial attitudes that seek innovative solutions and contribute to the development of the company. Adaptability in today’s work environment is also a prerequisite. The *Head of Studies for Vocational Training Cycles* emphasized that a professional who does not hesitate to innovate and drive solutions for the company can be a great asset to the company since the ability to adapt to changes and make proposals is significant.

Another point emerging from the interviews is the importance of a structured approach and methodology. As noted from Cyprus, there should be a framework or a kind of template on how the trainer should be trained by the company. Not many companies use diagnostic tools or surveys to take measures, so this area is still somewhat unexplored and observation-based, says the *Head of Training from Cyprus*.

4.3.7 Student Competencies

In the current educational landscape, the question also arises as to what skills and abilities vocational students need in order to successfully implement Applied Research in Vocational Education. Experts from the educational sector of various countries also commented on this point. Their statements convey a multifaceted picture of the necessary competencies.

The *Vet-Tourism-Student* succinctly makes the point: "Above all, students need to be instilled with the idea that there is no point in their professional life where learning 'ends'". This underscores the necessity of lifelong learning and the linkage between theory and practice. It is emphasized that "learning and studying need to go hand-in-hand with experience" for an objective and efficient processing of situations in professional life.

Curiosity is of great importance, according to the *Vice President* from Germany. In his view, the students' curiosity is of paramount importance and must be present and should be promoted and demanded by teachers. This view is complemented by the *Former School Principal* from Germany, who emphasizes that students need a "willingness to learn" and the "curiosity to engage in new things".

As the *College Director* emphasizes, digital skills are crucial for implementing and monitoring Applied Research Projects. Additionally, he underscores the necessity of "communication skills in order to talk to companies properly", which is particularly relevant when students work in an environment with external partners and companies.

The willingness to change and critical thinking are also central prerequisites for vocational students. The *Managing Director* points out that Applied Research can imply changes for the students. He stresses the necessity to be flexible and open and highlights that "critical thinking is very important for the trainees."

The *Head of Training* highlights a set of research skills needed by vocational students, including "attention to detail, with critical thinking, with comparing data, analysing data, evaluating results, drawing conclusions". These competencies are essential for effective research.

The importance of enthusiasm and a proactive attitude is emphasized by several experts. The *General Secretary* underscores that interest in the work they will do is crucial for the students' professional success. The *Manager* adds that students must be willing to think beyond the purely technical and proactively find solutions.

The *Italian Professor* emphasizes the importance of context knowledge and listening. She highlights that students and the school need "a very high listening capacity and a knowledge of the context". This also includes the ability to identify complex problems and seek help when needed.

The *Pedagogical Researcher* emphasizes the importance of technical competencies but also stresses the "hard core" of all skills, which include "LEARN TO LEARN, the spirit of initiative, critical thinking, active citizenship".

4.3.8 Collaboration between Vocational Schools and Companies

In an incessantly evolving global economy, the imperative for a seamless collaboration between educational institutions, particularly vocational schools, and corporations is

indispensable. This is especially salient in the context of Applied Research in Vocational Education and Training.

The *Vice President* from Germany emphasizes that corporations bear a duty to communicate their technology needs and the associated changes in the working environment to schools. This enables schools to better comprehend the labour market and its needs. The more effectively this operates, the better the school can qualify individuals for the employment market. This cooperation should transpire through regular encounters between schools and businesses, for instance, in the form of seminar days or open house events. Moreover, the *Head of Training* advocates for effective communication between schools and corporations. Absent clear communication, understanding and responding to the demands of the industry becomes challenging. The emphasis here lies on the close cooperation between innovations and vocational training. Active exchange between training companies and vocational schools is vital, with the needs and strengths of students being of central concern. The *Former School Principal* underscores the importance of an equal collaboration between vocational schools and businesses, with the focal point being on apprentices and their strengths.

The *Managing Director* from Spain perceives the necessity to adapt the curricula of Vocational Education to the reality of corporations. He underscores that private and subsidized Vocational Training Centers could be more aligned with business realities, impacting the quality of education. Often, structures here are too sluggish, experts opine, to actually prepare students for what corporations currently require. The Applied Research in VET should also adapt to these needs. The *VET Trainer* is of the opinion that Vocational Educational Institutions must be constantly informed about the fast-paced world. It is necessary to promote a culture of experimentation and to invest in research and innovation. The *Managing Director* from Spain highlights the significance of flexibility in education to adapt to the constantly changing demands of the industry. It is crucial that Vocational Training Centers are capable of swiftly revising their programs and reacting to current industry trends. The *German Professor* emphasizes that research should not only be theoretical but must possess substantial utility for the industry. The *College Director* stresses that it is also vital to involve corporations throughout the process. In this context, trainers should be acquainted with the corporation and its systems. The backgrounds of trainers should be congruent, enabling them to effectively operate in both worlds – education and industry. The *German Professor* emphasizes that not only the end product but also the learning process should be assessed. This would provide a more holistic approach to evaluating the competencies of students, ensuring they acquire both the necessary skills and knowledge. The *VET Trainer* from Italy perceives Applied Research as a key to bridging the gap between theory and practice. Allowing students to solve real problems and work on actual projects can significantly enhance their understanding and skills. The *College Director* also speaks about the necessity to create networks and partnerships at a regional level. This would enable schools to learn from the best practices of other schools while ensuring they meet the specific needs of their region.

The *Head of Training* talks about the hurdles employers face, especially in terms of time and money. However, there is an urgent need to map these needs and find effective solutions. Another vital aspect he highlights is the necessity to establish trust and credibility in communication. According to the *College Director*, not only full-time lecturers should be active

in the educational sector but also part-time lecturers who also work in corporations. Additionally, there should be a type of confidentiality agreement that allows Vocational Training Centers to access data they currently do not have, as proposed by the *Head of Training*. The *Italian Professor* also emphasizes the importance of school labs collaborating with corporations to implement Applied Research. The *College Director* underscores that teachers and trainers should be constantly trained to stay up to date. This would ensure that they integrate the latest technologies and methods into their curricula and can prepare their students effectively and better for the working world (see also 4.3.3 of this study).

Consequently, the collaboration between vocational schools and corporations in the field of Applied Research is not only desirable but essential to meet the challenges of the modern economy. It is clear that both parties can benefit from this cooperation if they communicate and collaborate effectively. However, clear structures, trust, and constant adaptation to the changing labour market are required.

4.4 High-Level Skills Required by VET Professionals

Vocational Education and Training (VET) professionals engaged in Applied Research projects within the field of Vocational Education require a wide range of advanced competencies. A pivotal competency among them is subject matter and methodological expertise, as they necessitate profound knowledge within their specific domains and the methodological acumen essential for designing and executing successful research projects. This expertise forms the foundation for formulating pertinent research inquiries and competently assessing outcomes.

In the realm of Vocational Education, Applied Research projects are assuming an increasingly vital role in developing innovative pedagogical methods and aligning education with contemporary labour market demands. To effectively undertake and oversee these projects, VET professionals in various countries must possess specific competencies and skills. While country-specific differences do exist, there are certain commonalities in the prerequisites that are elucidated herein.

A fundamental commonality lies in the imperative for VET professionals in all countries to have a clear comprehension of the concept of "applied research." This encompasses the ability to plan, execute, and apply the findings of Applied Research projects to practice. They need to understand how to formulate research questions, gather data, analyse it, and draw conclusions.

Furthermore, research proficiency is of paramount importance. VET professionals must be adept at employing appropriate research methodologies and techniques to collect data, analyse it, and derive well-founded conclusions from the results. This demands a deep understanding of both quantitative and qualitative research methodologies.

Communication skills are indispensable in all countries. The ability to collaborate across disciplines is another key competency. Applied research projects in VET often necessitate collaboration with colleagues from various fields and industries. Consequently, the capacity

for effective interdisciplinary communication and collaboration is pivotal. The results of Applied Research must also be communicated clearly and comprehensibly, whether in written reports and articles or through oral presentations. The ability to interact effectively with diverse stakeholders is essential.

Practical implementation is another shared feature. VET professionals must be capable of translating theoretical concepts into practice and accumulating practical experience to comprehend the requisites of the real-world labour market. This includes collaborating with businesses and other educational institutions. Cultivating a culture of research awareness and sensitizing individuals to the importance of research are critical steps in raising awareness of Applied Research in Educational Institutions and Businesses. Faculty commitment plays a central role in translating research findings and innovative methods into Vocational Education. Their dedication and willingness to engage in ongoing professional development are paramount.

In today's digital era, proficiency in utilizing digital tools and platforms is of great importance in all countries. Digital competence is crucial for effective communication, information retrieval, and the implementation of innovative teaching methods. Establishing digital platforms for research and idea exchange is crucial for facilitating research accessibility and promoting collaboration among various stakeholders.

Communication between trainers and apprentices has been identified as one of the challenges in VET. Enhancing these relationships and integrating research into curricula are critical. Furthermore, the connection to businesses and industries is central. Close collaboration between educational institutions and businesses has been deemed vital for the implementation of Applied Research. VET professionals must possess the ability to bridge both worlds and actively involve businesses in the research process.

Effective project management, including resource and timeline organization, is imperative in all countries to successfully execute Applied Research projects. Additionally, VET professionals must bring a willingness for ongoing professional development and adaptability to new trends. As education and the labour market continually evolve, it is crucial for them to learn continuously and adapt to new trends and practices. This requires the ability to delve into new topics and keep their knowledge up to date.

In summary, VET professionals seeking to conduct Applied Research projects in VET are highly competent individuals. They must possess subject matter expertise, research skills, interdisciplinary collaboration, practical experience, communication abilities, project management skills, adaptability, reflective capacity, and a disposition for innovation to effectively bridge the gap between theory and practice in vocational education and devise innovative solutions for current challenges. Reference is also made to chapters 4.3.2, 4.3.6, and 4.3.7 for further elaboration on these topics.

4.5 Opportunities and Risks

The interviewees consistently articulated opportunities and risks in the discussions that would accompany the implementation of Applied Research in Vocational Education and Training (VET). While many recognize the benefits and opportunities it offers, there are also concerns and perceived risks.

Opportunity: Innovation Driver for Small Businesses and Traditional Industries
One aspect that is emphasized time and again is the potential that young vocational students can bring to companies. An example comes from the *VET-Tourism-Student* from Greece: "In tourism, many small businesses operate in outdated ways, and I think it would be a blessing if VET graduates could come into a small business and shake things up for the better. These young people have the potential to bring some fresh ideas to the table if given the chance." Linking scientific methods with daily learning in VET could enhance the perception and status of vocational students.

Opportunity: Pragmatic Research
The *German Professor* points out that research conducted directly in and for companies is often more relevant and targeted: He believes that Applied Research in VET can be an engine of innovation for training companies. He also notes that companies feel a stronger pressure to innovate than academic institutions, which can lead to more pragmatic research.

Opportunity: Effective Solutions through Unconventional Approaches
The *Italian Professor* emphasizes that young people can often find unconventional solutions that companies would not have thought of: "On many occasions, students who unknowingly worked on educational applied research projects have found effective solutions which the company would never think of."

Opportunity: Bridge between Theory and Practice
Some of the interviewees, including the *Managing Director* from Spain and the *General Secretary*, emphasized the need and value of linking school and labour market through Applied Research in VET.

Risk: Acceptance and Integration in Higher Education
The *German Professor* points out that universities in Germany may not be seen as places of significant innovation and there are reservations towards new things: According to him, universities in Germany are not the place for major innovation. He further notes that some teachers are sceptical of new things and find it burdensome to adapt their curricula.

Risk: Practical Implementation
Although the benefits of Applied Research and the integration of students into companies are clear, there are still challenges in implementation. The *Managing Director* from Cyprus points out: "The hard, challenging part for the business is to implement it."

Risk: Preparation and Recognition of Schools

The *Italian Professor* notes that schools often have difficulty recognizing the value of applied research and integrating it systematically. Moreover, there is a risk that the balance between vocational training and teaching is lost.

Risk: Skills and Acceptance of Errors
Specific skills and mindsets are required for Applied Research. The *Italian Professor* emphasizes the need to accept mistakes and use them as a learning opportunity.

4.6 Promotion of Applied Research through Best Practices and Recommendations

Building on insights from Cyprus, special attention must be directed towards creating a motivation-enhancing environment. The College Director underscores the necessity of financial incentives, networking opportunities, and the connection to the community, economy, and society to enable Applied Research in VET schools: "So there has to be some motivation, some financial motivation, some opportunity to network. It can be something related to the community, the economy, and society."

The integration and acceptance of all stakeholders in the process are crucial. As the College Director emphasizes, "You have to convince them what you're doing it for." This persuasion and integration apply not only to teachers and learners but also to organizations and companies participating in VET programs: "The fact that the organization in which the applied research was being done was convinced that it (the research) had to be done in order for the training that would follow to be effective", recalls the Head of Training.

Italian experts have pointed out that an organizational framework capable of seamlessly implementing the outcomes of Applied Research and innovation models within the system should be established: "Establish an organizational framework capable of implementing the outcomes of Applied Research and innovation models seamlessly within the system," says the VET Trainer. This includes a "proactive capacity for transformation," which facilitates the implementation of research results and drives positive changes in the VET system and its associated ecosystems.

The College Director underscores the need for "the trainer becomes a trainee who normally has to accept it. What you teach, you have to do it, too." This emphasizes the importance of lifelong learning and continuous self-development as a role model for learners. Continuous improvement and the sharing of knowledge and best practices should be encouraged and institutionalized to achieve lasting impact.

The College Director suggests, "first of all, it should give some incentives, give some research projects funded by Europe." Research projects and innovations in the VET sector should be promoted through appropriate incentives, such as the provision of research funding or support for European projects. Furthermore, educational institutions should be supported in accessing and utilizing such resources and projects.

The focus should be on establishing successful examples and role models, as well as on the continuous promotion and dissemination of these practices. The German professor proposed organizing an annual congress at a university, under the patronage of the Federal Minister of Education, for example, where new accents are constantly set. With speakers presenting the latest scientific findings and vocational school teachers who may have explored new paths and can serve as role models. This way, not only scientific knowledge is shared, but practitioners can also serve as role models and share their experiences and best practices with others.

Therefore, best practices can serve as an anchor point to illustrate the possibilities that Applied Research offers in VET and motivate others to become actively involved.

4.7 Platform for Digital Collaboration

In an age of digitalization, it is indispensable to develop platforms that promote exchange and collaboration among various actors. Such a platform which we shall refer to here as the "Digital Collaboration Platform", holds significant promise for enhancing vocational education. Based on the statements of the interviewees, core requirements and functions for such a Digital Collaboration Platform can be identified.

Network Formation and Resource Access
The exchange and networking between vocational education institutions and companies are of central importance, as emphasized by the *VET-Tourism-Student*: "Networking between VET institutions and companies is crucial to truly benefit from the unique knowledge and skills of VET students and graduates." Therefore, the Digital Collaboration Platform should provide networking opportunities and information about interested organizations, including contact details and announcements of projects or collaboration options. Moreover, the student emphasizes the importance of interactive resources and guidelines for Applied Research. The *Owner of a SME* points out that the platform should be publicly accessible and that there should also be the opportunity to exchange information anonymously.

Best Practice Examples and Knowledge Exchange
Several interview partners, including the *Vice-President* from Germany and a *former German school principal*, highlighted the importance of best practice examples. Through such examples, all participants can learn from each other and avoid duplicating mistakes. The Digital Collaboration Platform should also offer an opportunity to present, compare, and discuss curricula to promote synergies and common approaches.

Design and User-Friendliness
A clear and appealing design is essential, according to the *German professor* and the *College Director*. The platform must stand out, catch the eye, and remain in the memory. At the same time, it must be user-friendly so that all actors - from students to companies - can recognize its benefits and use it effectively.

Interactive Learning and Exchange Formats
The *Vice-President's* suggestion to enable e-learning through a digital library and to establish a match-making system for needs and ideas is also central. The Swedish report also suggests offering different event formats, from traditional workshops to interactive hackathons and "Failure Sessions".

Participation of All Stakeholders
As emphasized by the *College Director* and the *Managing Director* from Cyprus, the construction and function of the Digital Collaboration Platform should occur in collaboration with all relevant stakeholders. Only in this way can it be ensured that all needs are considered, and each actor can contribute to the overall puzzle.

Physical Exchange as a Complement
While digital platforms offer many advantages, physical exchange should not be neglected, as emphasized by some interviewees, including the College Director. Personal encounters, for instance, in the form of Erasmus-like visits, can complement and deepen the digital exchange.

4.8 Conclusion

In the present chapter, the essence of the research findings regarding the implementation of Applied Research in Vocational Education and Training (VET) is outlined, which serves as a foundation for the subsequent Focus Group Discussion. The requirements that the interviewees see in order to implement Applied Research VET are described.

The identified **challenges**, emerging from interviews with various stakeholders, underline the necessity for a more agile adaptability of the training system to dynamic changes in the labour market. Here, the urgency of strategic, forward-looking planning and development, based on solid pillars and priorities at the state level, is emphasized. A policy developed through comprehensive consultations with all relevant stakeholders should ensure a realistic and widely accepted strategic orientation. Particularly, the **integration of the private sector and industry** into the development and implementation phases is imperative to ensure authentic application and practical relevance and to closely link political decisions with the real conditions of the labour market. Financial support and incentive systems from politics are considered critical factors to sustainably promote innovations and applied research in VET, especially to stimulate the innovative power and development potential within educational institutions.

Another critical point identified by the subjects concerns the **cooperation between vocational schools and companies.** There is a clear need for action to ensure effective communication and collaboration between the institutions so that technology needs and labour market requirements can be understood and addressed. Various measures, such as regular encounters in the form of seminar days or open house days, are suggested as means of promoting this communication. The curricula of Vocational Education should be adapted to the current reality of companies, with flexibility needed to respond to changing industry trends and promote a culture of experimentation and investment in research and innovation.

The hiring and recruitment of teachers are identified as critical points, with a careful selection of teachers who pursue an innovative and evidence-based approach to competence development, as well as improved financial remuneration to increase the attractiveness of the teaching profession and to secure the recruitment and retention of teachers, being deemed necessary. It is noted that schools are also in direct competition with companies and therefore must provide good working conditions to recruit qualified teachers.

Another central discussion point is the continuous focus on the ongoing qualification of VET teachers to ensure the quality and timeliness of the content conveyed. Various approaches, such as the implementation of a model of part-time teachers who both teach and work in the industry, as well as regular, mandatory internships for teachers, are suggested. Strengthening

digital competencies and developing entrepreneurial skills in teachers are also considered essential to keep pace with the rapid innovation pressure in the working world. The introduction of Key Performance Indicators (KPIs) for teachers is also discussed to ensure the quality of teaching.

The fundamental role of teachers as mediators and leaders for students is highlighted, and their ability to communicate and pass on "applied research" to students is considered central. Teacher training should integrate Applied Research and convey skills to adequately pass on content to students. School management should play a key role and strive for continuous improvement to drive school development.

Furthermore, a need for **stronger cooperation between universities and vocational schools** is articulated to maintain contact with current research and pass it on. This requires permanent network maintenance and can be facilitated by a person who does this as their main job and is responsible for it. International networking and maintaining contact with other universities with similar topics is crucial and must be continuously maintained.

In addition, the necessity of **practice-oriented and experience-based teaching** is emphasized, with learning through research and active experience in teaching being essential. **Updating the curricula** is crucial to adequately convey Applied Research Skills and facilitate the transition from the academic to the professional world. A teaching concept that combines theory and practice, and in which teachers act as active mediators of research competencies, is considered necessary.

The subjects unanimously emphasize the significant role of corporate culture, with a dedicated commitment and a conscious decision for Research and Development (R&D) being considered essential. Companies must be willing not only to invest time resources but also to recognize the intrinsic value of the R&D process. Innovation incentives and rewarding the innovative spirit of employees could act as catalytic elements to involve companies in research and development. A structured methodology, including a framework or template for training trainers, is considered necessary to support companies in this process.

Furthermore, the necessity of lifelong learning for vocational students is highlighted, with learning and studying, according to the subjects, running concomitant with experience. A range of key competencies is identified, including curiosity, willingness to learn, openness to new things, digital and communicative skills, as well as critical thinking and flexibility. The ability to "learn to learn," coupled with initiative and active citizenship, is considered the "core" of all skills.

The subjects articulated both opportunities and risks in the context of implementing Applied Research in VET. Opportunities include the possibility that young vocational students, with their fresh ideas and the application of scientific methods, can innovatively influence small businesses and traditional industries, as well as increase the status of vocational students through direct, relevant, and targeted research in companies. Risks include possible reservations and scepticism towards innovations and new approaches in colleges, as well as challenges in the practical implementation of Applied Research in companies.

Best practices could promote the implementation of Applied Research, with a focus on creating a motivation-promoting environment through financial incentives, networking opportunities, and reference to community, economy, and society. It is crucial to integrate and convince all participants (teachers, learners, organizations, and companies) in the process of Applied Research to ensure the effectiveness of subsequent training.

In conclusion, the interviewees comment on the functions that, in their view, a Platform for Digital Collaboration should have. The Hub should serve as a multifunctional platform that provides opportunities for networking and exchange between VET institutions and companies, including contact information and announcements of projects or cooperation opportunities. Furthermore, it should provide access to interactive resources and guidelines for Applied Research and present best practice examples. The platform should have a clear, appealing, and user-friendly design to appeal to all actors - from students to companies - and enable effective use.

5 RESULTS OF THE FOCUS GROUP DISCUSSION

In the focus group discussion, particular attention was given to the topics identified as crucial in the interviews. Firstly, the participants shall be briefly introduced:

- Business Representative: The business representative hails from Italy and works there for a large business organization. She is 38 years old.

- Chamber of Commerce Representative: The representative of a Chamber of Commerce in Spain works on the EU projects service of the Chamber of Commerce in Zaragoza. She is 27 years old.

- Higher VET Director: The Director of a higher VET Institute is from Italy and is 64 years old.

- Project Coordinator: The Project Coordinator for ERASMUS+ projects works at a foundation, established by a regional association of SMEs, that consolidates and represents a group of VET providers from Germany. Previously, she was a teacher herself. She is 55 years old.

- Programmer: The programmer is from Greece. He works there in a company and is 27 years old.

- E-Project Manager: The E-Project Manager is from Greece. She is 28 years old.

- Director: The Director is the head of a learning and development company specializing in cultural, social, and economic innovation. He is 64 years old.

Initially, the demand of the interview partners for agile and faster adaptability of Vocational Education to the needs of the labour market was discussed. The experts from the focus group discussion agreed with these demands: *". I absolutely agree (...) curricula should be adapted to the current reality of companies. Otherwise, companies are not interested at all ….in other students, and the matter of fact is that in Italy, in any higher VET institute we obtain these results,"* states the Higher VET Director. In Italy, this adaptation to the labour market is already discussed with the industry; however, the experts would also advocate for a more agile adaptation here. A lack of collaboration between vocational schools and companies is not something she can identify, but the Programmer from Greece can, attributing it to a lack of national initiatives. The Chamber of Commerce Representative from Spain also sees a problem here, as there are many SMEs in Spain that do not have the capacity to take on this task. The participants agree on the lack of agility: *"In Germany (...) we developed a curriculum on state level and the stakeholders are included in this process. It goes slowly, really slowly and this does not fit well with the agile mindset. So, there is a really huge gap."*

All experts in the focus group identify a lack of collaboration between vocational schools and universities: *"We have very low, very little collaboration, more or less any because in many cases that most of all for the higher VET institute. The university sees us as competitors, let's say, and it's in my opinion, completely wrong because we can mix the things",* said the Higher VET Director. The German expert points out that this also emanates significantly from universities. *"Normally we are very strongly structured into our different areas of education. So, we think in these like columns, vocational education and training and higher education and training. And this is really not."* The idea of hiring people for the **function of networkers** is welcomed by the experts. This is a practical idea that implies a thought, says the Director*: "You know, it doesn't happen by magic. (...) there needs to be investment in people and practices in order to make it a reality."*

Another point that leads to discussion is the recruitment and hiring of teachers. The Business Representative from Italy notes that there are no hiring tests and no review of teachers there. The Programmer from Greece also views this critically, as in his opinion, teachers can do what they want and there is no evaluation. In addition to KPIs, he suggests regularly testing teachers, checking their further education and willingness to learn, and also involving an evaluation by students. The Project Coordinator from Germany interjects that such an evaluation by students does exist in some places in Germany, but it is often discussed and ultimately a toothless tiger. However, teachers could pick up important feedback from it. She emphasizes that recruiting teachers and trainers, especially for vocational training centers, is a challenge and the success of the training strongly depends on the commitment of the teachers. She also talks about the necessity for teachers to develop their role from traditional teaching tasks to a role as advisor and companion in vocational training processes. This requires continuous further education and a change of mindset. The Project Coordinator emphasizes that teachers are generally willing to further educate and adapt themselves but are often restricted by circumstances such as lack of time and lack of access to further education opportunities. She emphasizes that employers must create a learning environment where learning is considered part of the job. Lifelong learning for teachers is also an indispensable condition in her view. The idea of the interview partners of part-time teachers,

who also work in companies, is basically welcomed by the experts of the focus group. However, other problems arise here: companies are currently having problems finding skilled workers. They may not be interested in sharing these skilled workers with vocational schools. In addition, the Business Representative points out that professional teachers, who come from companies, often do not have specific teaching skills and that their skills need to be refined, especially in terms of classroom management. The Director talks about the necessity to break down barriers and be more flexible in terms of the requirements and career paths of teachers, citing examples from the creative industries and modern hospitality industry. He emphasizes that some sectors already have dynamic relationships between "VET schools" and industry and suggests that there are lessons that can be learned from less structured and formal sectors. The experts in the focus group also agree to better pay for teachers to make the profession more attractive. The Business Representative emphasizes for Italy that teachers in vocational education (VET) often must act independently and praises efforts to engage teachers in VET school. She adds that, although teachers need to be trained, good teachers must also have an inner calling or "something extra" to be effective.

A central point in the focus group was also the type of teaching. More **experimental teaching**, which is interested in projects and their implementation and deals with the real problems in the industry, would not only be more interesting for teachers but also more motivating for students. The training would also benefit from this. Here, the Director points out terminology: *"I don't know if this is so much the case in your own languages, but we don't tend to talk about training so much now. We talk about learning of course and I don't really understand why they don't simply call it vocational education and learning."* Training would be an old term here, which would also convey a wrong image of today's training. He advocates a **focus on learning and problem-oriented learning** and notes that the term "training" is no longer at the forefront in modern learning and development approaches. The Project Coordinator agrees and emphasizes that the learner must take an active role in the learning process to be successful. The Business Representative concludes with the remark that teacher-centered teaching is a failure, and that successful teaching should take place more actively and in work groups, laboratory contexts, and in exchange with the environment and the territory. She emphasizes that the connection with companies and dealing with real problems could be appealing for both teachers and students.

6 SYNTHESIS OF FINDINGS

The insights from interviews and focus group discussions illuminate multifaceted challenges and potential associated with the implementation of Applied Research in Vocational Education and Training (VET). A consensus among experts suggests that, although Applied Research in VET can serve as an engine of innovation and has the potential to positively transform the landscape of Vocational Education, systematic changes are necessary to fully unleash its power. Notably, this is particularly remarkable, given that it does not seem to involve country-specific challenges, despite the varying educational policy landscapes within the different countries of the consortium (Cyprus, Germany, Greece, Italy, Spain, Sweden). Instead, experts from different countries agreed on many points they considered central, regardless of their area of expertise. No discernible differences in perspectives on the issues between older and younger experts were evident. This study includes experts ranging from 23 to 68 years old.

Furthermore, according to expert opinions, Vocational Education Professionals who are to conduct Applied Research projects in Vocational Education require a broad range of highly developed competencies. A crucial competence lies in domain-specific and methodological expertise, as they need profound knowledge in their specific fields and in the methodological approach to research projects to successfully design and conduct them. This expertise forms the basis for formulating relevant research questions and competently evaluating results. Communication skills of Vocational Education Professionals are of paramount importance in all countries. The ability to collaborate interdisciplinary is another key competency. Applied Research projects in Vocational Education often require cooperation with colleagues from different disciplines and businesses. Therefore, the ability to communicate and collaborate effectively across disciplinary boundaries is essential. The results of Applied Research must also be communicated clearly and comprehensibly, whether in written reports and articles or in oral presentations. The ability to interact effectively with various stakeholders is indispensable. Practical implementation is another common feature. Vocational Education professionals must be capable of translating theoretical concepts into practice and gaining practical experience to understand the requirements of the real-world workforce. This includes collaborating with businesses and other educational institutions. Promoting a culture of research and raising awareness of the importance of research are crucial steps to enhance awareness of Applied Research in educational institutions and businesses.

The willingness to adapt to new trends and developments in Vocational Education and the job market is crucial in all countries. Vocational Education professionals should be flexible and able to adapt to new challenges and changes. The ability to critically reflect and seek innovative solutions to continuously improve Vocational Education is a common feature. The education world and industry requirements are constantly evolving, and Vocational Education professionals should be able to question existing practices and seek better solutions. Therefore, research results must not only be achieved but also translated into practical solutions that meet the needs of learners and businesses. The commitment of teachers plays a central role in implementing research results and innovative methods in Vocational Education. Their commitment and willingness to continue learning are crucial for success in Vocational Education. As education and the job market are constantly evolving, it is crucial

that they continue to learn and adapt to new trends and practices. This requires the ability to delve into new topics and keep one's knowledge up to date.

In today's digital world, the ability to use digital tools and platforms is of great importance in all countries. Digital competence is crucial for effective communication, researching information, and implementing innovative teaching methods.

In summary, Vocational Education professionals who wish to conduct Applied Research Projects in VET must be highly competent experts. They must possess domain expertise, research skills, interdisciplinary collaboration, practical experience, communication skills, project management skills, adaptability, reflective capacity, and willingness to innovate to successfully bridge the gap between theory and practice in vocational education and develop innovative solutions for current challenges. At this point, please also refer to Chapters 4.3.2, 4.3.6, and 4.3.7.

The framework conditions in vocational schools were identified as a critical point both in interviews and in the focus group. Curricula were discussed, which often are not or only inadequately adapted to the current needs of the job market and businesses. A more agile responsiveness of the vocational education system is essential. This also includes a shift in learning away from traditional classroom teaching towards a stronger focus on project and research orientation, where "learning by doing" takes center stage. Applied Research in VET can play a key role here by promoting project-based work that focuses on current business challenges. This could not only signify significant progress for all stakeholders but also positively influence the image of Vocational Education, which seems to be suffering in some of the examined countries (such as Germany and Greece).

The implementation of practice-oriented research in Vocational Education is recommended by experts from various perspectives, with the understanding that this implementation requires investments. However, these investments can be recouped elsewhere, for example, by increasing the attractiveness and relevance of vocational education, thereby improving the adaptability of graduates to the job market.

Another critical point raised by all interviewees concerns the recruitment and training of teachers. In this regard, it is essential that policy promotes and demands lifelong learning to ensure that teachers remain up to date regarding business needs. Various measures are necessary to make the teaching profession more attractive, including better compensation, relief from administrative tasks, periods for further education, and the implementation of Applied Research in VET, which can also enhance the attractiveness of the teaching profession.

Furthermore, the infrequent cooperation between vocational schools and universities was highlighted by experts in both interviews and the focus group. The implementation of Applied Research in VET could also act as a bridge here, with universities utilizing their expertise in Applied Research to implement this area in vocational schools, thereby bridging the gap between theoretical research and practical application.

Overall, these recommendations underscore the need for a comprehensive and thoughtful strategy for implementing Applied Research in VET to enhance the quality, relevance, and attractiveness of vocational education for students, teachers, and businesses. This comprehensive and thoughtful strategy can be understood as a prerequisite. It is noteworthy that this observation applies to all six countries examined. Therefore, it is only logical to assume that similar steps would need to be taken in other European countries to implement Applied Research in VET.

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APPENDIX: Guidelines for qualitative interviews and reporting form

NEARVET project

Guidelines for Qualitative Interviews
AND Reporting FORM

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A qualitative guided interview is a research technique used to collect qualitative data by interviewing experts to discuss a specific topic, issue or product. The goal of a qualitative guided interview is to gain insights into the attitudes, opinions, and perceptions of the participants regarding the topic being discussed.

During a qualitative guided interview, a trained interviewer asks open-ended questions to encourage participants to share their thoughts and opinions. The key to running a successful interview is in the facilitator's ability to make the participants feel safe and comfortable. The Interviewer must make it clear that the subject is the expert and that it is not about right or wrong answers, but about the subject's opinions, experiences and insights. Qualitative guided interview as a research method allows to pick up on nonverbal information which may be important to the research (for example, excitement, doubt, hesitation or stress). They also help understand the causal link between why people behave in a certain way or hold a certain set of beliefs. This will be useful when designing the project learning material.

Qualitative guided interviews are adapted for qualitative (narrative) research but will not be useful for generating fast numbers. It's also important to note that qualitative guided interviews are not always representative of the broader population, and the insights gained should be considered alongside other forms of research.

Timeline

1) feedback on this guideline: 16.06.2023

2) possible online meeting to clarify doubts: 15.06.2023, 12 o´clock
3) indicate in excel type of expert: 16.06.2023
4) hold interviews and write up national report: June, July, August
5) send report to FHM: 04.09.2023
6) FHM writes report on attention areas: until 15.10.2023.
Number expected participants: 3 Interviews per country; total of 18 interviews
Objective: We conduct qualitative guideline-based expert interviews in order to get closer to answering our research question. WP2 says: "The project will conduct primary research (interviews and focus group discussions) to identify the high-level skills required by VET professionals in order to be able to conduct and supervise applied research projects."
WP2 objectives:

- Identification of skills required by VET teachers, in order to be able to conduct and supervise applied research projects
- Identification of skills required by private sector Managers, in order to be able to conduct and supervise applied research projects
- Identification of the basic Applied Research skills required by VET graduates
- In order to compile and publish a report on attention areas required per profile for efficiently contacting applied research in VET.

It is important for a guide that it does not have to be worked through in exactly the same way. In the best-case scenario, engage your conversation partner in an expert discussion in which you repeatedly ask your expert at the right moment to continue thinking and speaking in a direction that is exciting for us. The guide is intended to serve as a discussion guide.
The main questions usually have further sub-questions. Of course, if these sub-questions have already been answered in detail in the main question, they do not have to be asked again. Please internalize this guide so that you can participate attentively in the conversation. It is best to ask comprehension questions directly.

Important: We carried out a pretest with this guide in Germany and then adapted it. This does not mean that the guidelines are also useful in this way for the other countries involved. If, after your first interview, you feel that the guide still needs to be adjusted, please write down any minor and major adjustments which should be considered by all partners and contact us **immediately**!

Interview partners: Please indicate ASAP which type of "expert" you would like to interview, so we can make sure we cover a balanced number of different experts amongst all of us. As you go on, update the Excel list that was made available to you online with the information about who exactly and when you will interview them. Please remember the interviews have to be completed by the end of August 2023. And your summary report sent to us at FHM by the 04.09.2023.

For each of the following target groups we need a maximum of 5 interviews.

1. Experts who have done research on the topic Applied research in VET (We need to make sure as a consortium to include in the interviews academic or research practitioners in relevant institutions, particularly Universities, not just VET experts.)

2. Teachers: Vocational training researchers, officials in the vocational school teachers' association, vocational school teachers, headmasters of vocational schools
3. Students: student representatives of vocational schools
4. Business: Private sector managers

The duration of the interview would be around 1-2 hours. All the responses of the participants are strictly confidential and anonymous.

Interviews should be held in the local language and are not required to be shared with the partnership. The reporting forms of the interviews must be written in English.

1. Tips for qualitative interviews

In qualitative guided interviews, it is important to put the experts into a flow of thought and speech. Therefore, please give the subject pauses to think and give the subject time. If the subject does not know an answer directly, signal him/her verbally and/or non-verbally that you have the time. Example: "...take your time with the answer. This is not a problem."

Stay with your subject! So don't look up what your next question is while the subject is still speaking. In this way you ensure that you actually hear everything and that the subject does not think that they are saying something unimportant. If the subject says something unimportant, you can of course use means to make it clear to him nonverbally by looking for the next question or not writing it down if you have otherwise made notes.

If the subject deviates: "...thank you very much for this statement, but maybe we can come back to my original question: ..."

Or: “That is also an exciting line of thought, but I think it leads too far, especially for our research interests. Maybe we could come back to XY.”

Keep signaling that you are really listening. By making eye contact, nodding, or saying "ah, I see." or "oh, interesting." Encourage the subject to continue talking. In your questions, feel free to repeat what has already been said: “You just mentioned that XYZ. Now, if we look at this XYZ again under the assumption C, what would you think of it?"

If you have the feeling that the teacher being interviewed suddenly wants to take the perspective of the professor or student so as not to position himself, use references to the area of his expertise: "... that's an exciting story. But if we look at topic C again with your glasses as an expert in the area XYZ..."

Try to clarify questions of understanding immediately. Always ask open questions and not yes/no questions.

Once again: **The goal is to have an exciting discussion that will help us to answer our question**.

4. TEMPLATE FOR AN INTERVIEW DISCUSSION GUIDE

Here's a template for a interview discussion guide:

Stages of the interview	Content	Explanation
Introduction	• Explain the purpose of the interview and the research objective • Explain the role of the participant • Obtain consent for audio recording	• Thank you for your participation in this research project! Previous studies have provided evidence that vocational training can be an innovation engine for applied research in SMEs. **As applied research, we mean research that focuses on solving practical problems.** • The aim of this interview is to develop a better understanding of the steps required to integrate applied research into professional training. **You are an expert in this field; there is no right or wrong answer: we want to hear your experiences and opinions**. Your answers and the answers of other experts will give us a comprehensive picture of the current situation. We would like to record this conversation so that we can then transcribe it for analysis. Your answers will be anonymized. • Obtaining **consent for audio recording** means that the individuals who are being recorded have given their permission and agreed to be recorded. This is an important legal and ethical requirement, especially when conducting research or any other activity that involves recording people's voices and images. Consent is typically obtained through a consent form, which outlines the purpose of the recording, how the recording will be used, and the rights of the participants. The form should also explain that participation is voluntary, and that participants are free to withdraw from the recording at any time. Before the recording starts, participants should be given an opportunity to read and understand the consent form, ask any questions, and sign the form to indicate their

		agreement to be recorded. Obtaining consent for audio recording is important because it ensures that the privacy and confidentiality of the participants are protected, and that they are aware of how the recordings will be used. It also helps to establish trust between the researcher or interviewer and the participants and demonstrates a commitment to ethical research practices.
Section 1: Definition of Applied Research in VET	• Ask participants to define applied research in VET. • Ask open-ended questions related to the research objective • Encourage participants to share their opinions, experiences, and attitudes • Follow up on interesting points raised by participants	We have just explained our understanding of applied research in vocational training in the introduction. Do you have the same understanding of applied research in vocational training or did you initially think of something else? If yes, what? a. Would you give a different name to this type of research that focuses on solving real-world problems? If yes how? b. In your opinion, which terms would go down best with practitioners: applied research, experimentation, innovation development, research consideration? (please insert if a term was mentioned in 1a)
Section 2: Image of VET	• Ask for image of VET	What is your general impression of the image of vocational training (by companies, learners, Universities etc.)?
Section 3: Feasibility	• Can Applied Research in VET be an innovation engine	What do you think: in what ways can applied research in vocational training be an innovation engine for assisting companies to address challenges and solutions? a. Why do you think so?
Section 4: Personal experience with applied Research in VET	• Describe experience with applied research in VET • Describe personal experience with applied research in VET • What contributed to the fact that applied research could take place? • What roles played the company or employees, what the student, what the teacher or school?	Please describe what experience you have with "applied research" in the field of vocational training. a. Please think about an example of applied research in vocational education that you have seen, been involved in or heard about. Take your time if you can't think of an example right away. If you can think of an example, could you please describe it for us? b. If you think about the example you have chosen: what has contributed to the fact that applied research could take place in the field of vocational training in this example? ▪ What role did the company and/or its employees play in this?

		▪ What role did the vocational student play? ▪ What role did the vocational school and/or vocational schoolteachers play?
Section 5: Company needs	• Company needs for applied research • What is necessary to meet needs (company, trainer, school student, politics?)	If we take a look at the companies: What needs do you see on the company side for applied research? a. What do you think is necessary to meet these needs? ▪ What does the company have to do itself? ▪ How must the trainer be trained by the company? ▪ Do you have an idea how such a training could look like? ▪ What does the vocational school have to do? ▪ What do the vocational students have to do? ▪ What policies do you think would be needed in the context of i.e. VET, active labour market, education etc.?
Section 6: VET schools	• Schools need to promote applied research. • What is necessary to meet needs (company, trainer, school student, politics?)	If we now take a look at the vocational schools: What does the school need to do to promote applied research? a. What conditions must schools create in order to promote applied research? b. How do VET institutions support (or could support) teachers and students to transform their experiences into new knowledge and improved practice? c. What skills do teachers need to have in order to convey "applied research" to students? ▪ What do you think: do teachers have the skills you want, or do they have to be acquired first? ▪ Where could these competences be acquired? ▪ Do you think teachers would be willing to acquire and teach these skills? d. In your opinion, how should the cooperation between vocational schools and companies look like? e. Which partnerships with other research organizations would be appropriate? f. What does politics have to do to promote applied research at vocational schools?

Section 7: Student skills	• What skills are required on the part of the students	If we now think about the learners/students again: What skills are required on the part of learners in order to be able to carry out and supervise applied research in their projects?
Section 8 Digital Hub	• What functions should this hub have in order to promote applied research in VET?	Part of our research project is the creation of a digital hub. In your opinion, what functions should this hub have in order to promote applied research in vocational training? a. What could the framework for a practical dialogue between the different stakeholders look like? b. In what way could they stimulate each other's content?
Section 9 Open thoughts	• Anything to add?	Do you have any other thoughts that we haven't talked about yet? Or would you like to add something to the subject areas?
Section 10: Background Information	• Ask participants to introduce themselves and provide background information, such as occupation, location, etc. • Ask participants to describe their experience with the topic being studied	Finally, let's move on to some demographics: a. What points of contact do you personally have with the field of applied research in VET? b. How old are you? c. What is your current job title? Which functions do you fill in your company/your institution? d. How long have you been in this role? What have you done before? e. What training/ degree did you complete? f. If you wish, we would be happy to send you the final report of this research work. For this purpose, we would need your email address.

5. INTERVIEW REPORTING FORM

Please complete the grid below by summarizing the answers of the subject and by highlighting the key findings. The report should be around 10 pages.

Partner name	
Country	
Contact Person	
Number of facilitators	
Date	
Duration	
Place	
Introduction	
Section 1: Definition of Applied Research in VET	
Section 2: Image of VET	
Section 3: Feasibility	

Section 4: Personal experience with applied Research in VET
Describe experience with applied research in VET
Describe **personal** experience with applied research in VET
What contributed to the fact that applied research could take place?
What roles played the company or employees, what the student, what the teacher or school?
Section 5: Company needs.
Company needs for applied research

What is necessary to meet needs (company, trainer, school student, politics?)
Section 6: VET Schools
Schools need to promote applied research
What is necessary to meet needs (company, trainer, school student, politics?)

Section 7: Student skills
What skills are required on the part of the students
Section 8: Digital Hub
What functions should this hub have in order to promote applied research in VET?
Section 9: Anything to add?

Section 10: Background Information
What points of contact do you personally have with the field of applied research in VET?
How old are you?
What is your current job title? Which functions do you fill in your company/your institution?
How long have you been in this role? What have you done before?
What training/ degree did you complete?

If you wish, we would be happy to send you the final report of this research work. For this purpose, we would need your email address.

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