Result 5.1

A coordinated approach to promoting innovation by SMEs

Technology transfer process and innovation promotion of SMEs

Hanse-Parlament

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1. Project Summary and Introduction

The word region is defined as "an area, especially part of a country or the world having definable characteristics but not always fixed boundaries"[1]. The Baltic Sea region (BSR) is particularly unique. While the Baltic Sea is the pivotal point defining much of the region's characteristics and challenges, the countries are also extremely different. Geographically, they are divided between Northern, Western and Central/Eastern Europe, historically, they have been shaped by the East-West divide after the second world war. Nevertheless, given their proximity to the Baltic Sea, they have much in common.

The EU has acknowledged this by issuing the very first macro-regional strategy, the EU Baltic Sea Region Strategy in 2009. As most countries boarding the Baltic Sea were by then EU member states, it can well be considered the EU's inland sea. The challenges, such as saving the sea, i.e. ensuring clear water, rich and healthy wildlife as well as clean and safe shipping, and the opportunities for a prosperous region through cooperation measures to increase innovation, deepen the single market by improving transportation systems, connecting energy markets and fighting trans-border crime together, make the region very distinct from other parts of the world. Therefore, "BSR integration is best understood as the way that European integration has been translated into this region, further deepening and leveraging access to the rest of Europe and the markets that the EU provides"[2]

Over the past 25 years, this region has become a densely integrated, e.g. in the areas of trade, investment, labor mobility, transport and energy infrastructure as well as research collaboration. Furthermore, it demonstrates a broad landscape of robust cross-border organizations and collaborative efforts. Nevertheless, "companies do not look at the Baltic Sea Region as one integrated market in terms of their strategies. For most of them, the region remains a group of individually small markets within the EU, each with its different dynamics, rivals, and often even regulatory rules'"[3].

Keeping this in mind, the lack of comprehensive regional data collection is surprising. Therefore, as part of the Erasmus+ funded project "Promoting permeability through dual bachelor's programs with integrated initial and further vocational training" (BA&VET), an analysis of the region's demography, economy, and labour as well as education market has been conducted. The majority of the data is taken from the Eurostat database of the European Union. When needed additional sources, such as the OECD database have been consulted as well.

1.1 Project summary

Objectives: What do you want to achieve by implementing the project?

[1] Oxford Dictionary
[2] Skilling, David (2018). *The Baltic Sea Economies: Progress and Priorities*. Copenhagen: Baltic Development Forum, p.10.
[3] Ibid., p.11

- Increasing permeability between vocational and higher education
- Recruiting universities for tasks of further education in climate and environ-mental protection
- Providing excellently qualified entrepreneurs, managers and skilled workers and reducing the shortage of skilled workers to meet the challenges in climate and environmental protection
- Strengthening the productivity of SMEs through innovation support and R&D projects
- Promoting cooperation between SMEs and colleges/universities

Implementation: What activities are you going to implement?

- Analyses economy, education and labour markets and qualification needs
- Creation of solution models for 4 project countries
- Development and implementation of Train the Trainer program
- Development and implementation of 2 dual three-stage Bachelor's degree programs and 2 further trainings in climate and environmental protection
- Implementation of R&D projects in SMEs
- Quality assurance for training measures and project implementation
- Dissemination, transfer of results and implementation consultation

Results: What project results and other outcomes do you expect your project to have?

- Result report of the analyses of the economy, education and labour markets and qualification needs
- Solution models for four project countries
- Complete train-the-trainer program
- Module manuals with all documentation for two dual three-stage Bachelor's programs in climate and environmental protection
- Two further education programs in climate and environmental protection
- R&D projects implemented in SMEs
- Quality manual and results reports
- Manual, result videos and broad regional transfer of results

1.2 Objectives, results and target groups

The main objectives of the project are as follows:

a) Increasing the permeability between vocational education and training and higher education and thus promoting the attractiveness of vocational education and training

b) Strengthening the recruitment of colleges/universities for the important tasks of continuing education in climate and environmental protection

c) Providing highly qualified entrepreneurs, managers and skilled workers who, in addition to good theoretical knowledge, also have practical competences, skills and professional experience in climate and environmental protection and reducing the shortage of skilled workers to cope with the very large tasks in the energy, climate and environmental sector.

d) Attracting entrepreneurs and executives who have all the skills to successfully run a company and perform high-quality tasks in climate and environmental protection

e) Strengthening the productivity and competitiveness of enterprises through knowledge and technology transfer, promotion of innovation and implementation of manageable R&D projects

f) promoting cooperation between SMEs and colleges/universities, strengthening colleges/universities to implement dual courses of study on climate and environmental protection, and promoting entrepreneurship in higher education.

In pursuit of these objectives, the following results will be achieved:

1. Analysis results on the economy, demography, education and labour markets as well as qualification needs in climate and environmental protection

2. Curriculum, Teaching materials, implementation report and evaluation concept and report for teacher training

3. Module handbooks with integrated continuing education, teaching materials, examination regulations, implementation reports as well as evaluation concept and reports for a three-stage dual Bachelor's degree program

- Business Administration and Sustainable Management for SMEs
- Management of Renewable Energy Technology in Buildings

4. Concept for promoting innovation by SMEs and evaluation concept and report

5. Concept for innovation promotion of SMEs and R&D projects carried out for SMEs

6. Concepts and report for the evaluation and quality assurance of qualifications and

R&D subsidies as well as project implementation, transfer of results, implementations and implementation consultations

The primary target groups of the project are:

a) school leavers who wish to combine vocational education and training with a bachelor's degree and thus receive excellent employment and professional career opportunities.

b) students who are qualified in higher education and university and at the same time in a company and who are highly welcome in SMEs as managers and professionals or as independent entrepreneurs.

c) owners, managers and specialists of SMEs who are qualified in continuing vocational training, acquire tailor-made competences and skills for high-quality activities in climate and environmental protection and achieve a recognized continuing vocational qualification.

d) SMEs that attract suitably qualified young entrepreneurs, managers and specialists, receive innovation funding and carry out R&D projects together with colleges/universities.

The project addresses the following secondary target groups (beneficiaries):

a) colleges and universities which, in order to expand their educational opportunities in climate and environmental protection, receive all the documents and materials for two new dual bachelor's degree programs in order to meet the labour market needs and the conditions of SMEs in particular.

b) chambers and other vocational training institutions which attract strong young people to vocational training, receive curricula for continuing vocational training modules for the qualification of SMEs and their staff, and cooperate intensively with col-leges/universities in teaching and innovation promotion.

c) teachers, advisers and lecturers from chambers, other VET providers and colleges/universities who are qualified in Train the Trainer programs to provide high-quality further training, to carry out dual study courses in cooperation with companies as well as innovation promotion and R&D projects for SMEs at a high-quality level.

1.3 Development concept for the innovation promotion of SMEs

Within the framework of the project "Promoting permeability through dual bachelor's programs with integrated initial and further vocational training (BA&VET)",

a) two further training courses
   - Commercial Specialist in Sustainable Management
   - Energy Consultant

   are being developed, tested, evaluated, transferred and implemented for SMEs. At the same time, these training courses are intended to promote innovation in the companies.

b) two three stage dual Bachelor's degree programs with integrated vocational education and further training
   - Business Administration and Sustainable Management for SMEs
   - Management of Renewable Energy Technology in Buildings

are newly developed, practically tested, evaluated and implemented.

In direct connection with the implementation of further trainings (a)) and Bachelor programs (b)), innovation support for companies is to be realised. For this specific support of enterprises, a concept is presented which were applied and evaluated during the project period in connection with the testing of the education programs.

2. Promoting innovation and SME needs

Small and medium-sized enterprises are the backbone of the economy. At the same time, they stabilise the development of the society. They are anchored in their region and can use the possibilities of international cooperation and strengthen their position without relocating their workplaces abroad. The economy of the Baltic Sea Region will be shaped mainly by small and medium-sized enterprises, which provide over 99% of all services and about 70% of all workplaces. The Baltic Sea Region, with its efficient SME economy, has excellent opportunities for economic strengthening and mastering international competitiveness. The Baltic Sea Region has the best prospects to develop into an innovative and economically strong region with international recognition.

The Baltic Sea Region has excellent potentials at its disposal in the field of know-ledge economy, university education, as well as research and development. Employees are the most important asset especially in small and medium-sized enterprises. However, in this respect significant shortages are looming for the future. Securing the inflow of trainees to excellently qualified enterprises, management and labour force, as well as significant innovations decide about the future of small and medium-sized enterprises, and therefore, they are the most important support task for SMEs and crafts.

Mastering the future requires intensive cooperation: “links are more important than products “. Information technologies come as problem solvers when needed. Cooperation’s concentrate strengths, however, they preserve independence. Trust and cooperation management is sought after. Successful enterprises and cooperative cultures have to be based on strengths, encompass integration of employees and use the creative potential of all minds. And indeed, SMEs require specific assistance for as the use of opportunities and minimising the risks.

At the time of the Hanseatic League the Baltic Sea Region has been one of the most innovative regions in the world and also today it has distinct innovation potentials at its disposal, which have to be generated and used. The international competition can be won only provided that the Baltic Sea Region will be faster and better than other regions, and again, the most innovative territory in the world.

Effective innovation strategies in the Baltic Sea Region have to extend region-specific strengths, support spatial cooperation of strong points and the division of labour, as well as use cultural differences as a potential for creativity.

Excellent fields for innovation for the SME economy apply to all domains which are currently shaped by shortages. Within the shortage areas of energy, climate and environmental protection, health, information processing and problem-solving capabilities, electronic production and communication systems, as well as personal and organisational development, the Baltic Sea Region has distinguished learning and research

capabilities, as well as large entrepreneurial potential at its disposal, so that especially promising starting points for targeted innovation policy could emerge here.

Support for research and development by universities and colleges has to turn towards the SME economy in a more intensive and consistent way. Promotion of some clusters of high-tech development is an important part of the present innovation policy. However, a specific innovation promotion for small and medium-sized enterprises must be particularly developed and intensively realised. Customer-oriented definition of innovations and a more concise policy of support is therefore important here and it can allow for example for the development of adjusted techniques and new products, new forms of organisation and the involvement of employees in the process of innovation or the transfer of technology.

Colleges and universities have to assume the transfer of innovation, which is an essential task for small and medium-sized enterprises, as a binding and obligatory task. Study and graduation activities should consistently incorporate the development tasks of small and medium-sized enterprises.

Cooperation between colleges and universities, as well as small and medium-sized enterprises has to be strongly improved and expanded. Therefore, chambers and prominent support institutions of the SME economy can assume the economic communication functions.

Promotion of SMEs must be given highest priority. Particularly important for small and medium-sized companies are long-term strategies that are implemented consistently and reliably. SMEs need a reliable framework in which they can orient themselves and conduct safe planning.

Smaller companies cannot have at their disposal corporate staff functions, as large companies' do that would cover a variety of management tasks. In case of the medium-sized businesses those staff functions and support functions need to be rendered outside within the framework of universities and economic self-government. The universities are the key innovation service providers giving small and medium-sized enterprises the necessary tools and guidance, company specific and reliable, and offering them monetary benefits. Relate highest policy priorities for the promotion of SMEs: a) the area of education, innovation and internationalization, since for many regions of the Baltic Sea the largest growth opportunities and resources for the SME sector are found here.

b) any forms of intra-and inter-company and international co-operation of SMEs, which should be systematically sourced from the chambers.

Specific innovation support for small and medium enterprises must be developed and implemented consistently. There is a need for user-and demand-driven innovation and broader support policies that actively take into account, for example, social and organizational innovations, development of appropriate technologies and new products, new

forms of organization and employee involvement in innovation processes and the transfer of technology. Companies do not necessarily have to invent something themselves but could take good ideas and new technologies and modify those for themselves. Funding for the implementation of innovations in enterprises should therefore be increased.

There is an urgent needed for a broad concept of innovation that is geared specifically to the needs of small and medium enterprises. Promotion of innovation should involve development of new technologies, high-tech and appropriate tools, new discoveries and honing, product-, process-, and organizational and social innovations. A very significant added value must be sourced from all innovation subsidies, the one affecting the growth of the "human resources and organizational development" and including education, organization of work, development of partnerships etc.

The promotion of research and development by colleges and universities must turn more intensively and consistently to medium-sized businesses. Colleges and universities need to be given a mandatory task to serve as an important innovation transfer medium for the economy. In course of studies and thesis papers the issue of development small and medium enterprises should be brought up consistently. According to the principle of "region as a living laboratory" research institutions need to achieve a variety of measures to promote innovation with and for the medium-sized businesses, such as tailored research and development projects, effective knowledge sharing, development and transfer of adapted examples of best practice or the implementation of demonstration projects.

In a comprehensive study and survey of SMEs from Germany, Lithuania, Norway, Poland and Russia, the need for innovations in SMEs and their promotion was examined. The results of the study are summarised below.[4]

The role which SMEs play in the economy of the Baltic Sea Region makes creating adequate conditions for their innovation and competitiveness growth a key challenge. For this reason, it is vital to broaden our knowledge of the level of SMEs innovation and to gather data on a demand for innovation support in SMEs.

In the study, the Baltic Sea region entrepreneurs have been asked to specify a kind and a degree of intensity of innovation changes implemented in their companies. It turns out that marketing and product innovations are most frequent. Moreover, an innovative climate based on openness in organization culture in these companies has proved to be an important factor in innovation implementation in the majority of the analyzed SMEs. SMEs in general have a bad opinion about the innovation climate in the country in which they operate. A difficult access to financing innovation activities by financial institutions is a common problem with building a friendly innovation climate in all the analyzed countries. Major problems which SMEs struggle within innovation

[4] Development and Demand of Innovation Support in the Baltic Sea Region, Baltic Sea Academy, Hamburg

implementation are lack of financial resources, complicated legal procedures, and a deficiency of adequately qualified staff.

A cooperation with scientific and R&D circles and other institutions designed to increase SMEs innovation level is vital on the account of the specificity of SMEs, which generally have limited human resources and a low financial potential. The results of the analysis indicate that local authorities including chambers of crafts and commerce and entrepreneurs' associations are major partners in innovation cooperation for SMEs.

As far as an SMEs cooperation with R&D institutions is concerned, a leader-role is generally played by universities. Moreover, the intensity of this cooperation is quite high. The percentage of SMEs cooperating with R&D centers amounts to 50% in the Germany, 64% in Norway, 75% in Lithuania and 90.9% in Russia. Only the Polish SMEs declare a very low intensity of contacts with R&D sphere (only 16.37% of the Polish SMEs can boast of such contacts). The intensity of cooperation with R&D institutions does not translate into R&D projects in the Baltic Sea Region SMEs, however.

In the majority of the Polish, German and Norwegian SMEs, there have not been any R&D activities, when the study was conducted. The Russian and Lithuanian SMEs are exceptions to this rule, because 9 out of 10 analyzed enterprises have been involved in R&D projects. Product and service enhancements are a predominant type of R&D activities presented in the Baltic Sea Region SMEs.

Moreover, the study has shown that about 90% of the analyzed SMEs can see barriers impeding cooperation with scientific institutions. The major barrier SMEs encounter is insufficient proper funds to finance R&D and difficulties with access to external financing. However, according to the SMEs, the reasons for low intensity of cooperation with R&D sphere are scientific institutions themselves - SMEs report difficulties with initiating cooperation with scientific institutions, a lack of interest of these institutions to involve in such a cooperation, and ignorance of the economic subject matter on behalf of these institutions' representatives.

Barriers preventing cooperation between SMEs and R&D institutions (in %)

	Poland	Norway	Lithuania	Germany	Russia
Substantial costs, financial barriers	41	76	50	38	55
difficulties with starting a cooperation	29	32	33	31	36
lack of interest of R&D institutions to start a cooperation	20	28	42	19	19
legal barriers	18	4	8	X	X
R&D representatives do not understand the issue	18	64	46	25	27
communication problems with R&D representatives	10	36	29	13	X
no barriers	11	8	X	6	18

other (if so, what kind of barriers)	2	x	8		x

An attempt has been made to assess the demand for innovation in SMEs when analyzing the Baltic Sea Region SMEs' innovation potential and their cooperation with R&D sphere.

It turns out that SMEs from all the countries indicate a high demand for R&D activities. Polish SMEs are an exception in this respect, because only 1 in 3 of the analyzed enterprises shows interest in R&D activities. Unfortunately, a high demand for R&D is not accompanied by SMEs' intentions to conduct such research in the future. The study shows a high degree of uncertainty among SMEs as to satisfaction of their R&D needs.

The demand for specific types of support from universities has been much lower than the analyzed above demand for periodical R&D. The entrepreneurs have been mostly interested in periodical trainings and workshops for enterprises which were preparing, or which were involved in innovative projects, as well as information meetings on specific types of and kinds of innovations. Such a low level of demand for support from universities is due to the fact that most analyzed SMEs cannot see any potential benefits resulting from cooperation with scientific institutions.

SMEs demand for innovation support from universities (in %)

	Poland	Norway	Lithuania	Germany	Russia
information meetings on types and kinds of innovations	30,7	41,6	37,5	33,3	72,3
periodical trainings and workshops for persons preparing and realizing innovative projects	35,5	58,3	50	20	36,6
allowing access to practical training and didactical materials	22,6	16,7	16,7	20	36,4
individual consulting directly in the company	22,6	37,5	62,5	26,7	18,2
individual consulting by phone	7,3	20,8	16,7	x	x
individual consulting via e-mail	11,5	16,7	16,7	x	x
other	2,94	x	4,2	x	x

The only positive effect of such a cooperation, which a majority of the analyzed SMEs from all the countries have agreed upon, is "launching new products and services". However, the analyzed SMEs have declared a very high demand for trainings and consulting services from scientific environment. Services, products and new technologies are desired fields of a possible cooperation

Finally, cluster involvement in innovative projects of the Baltic Sea Region SMEs as well as their intentions to engage in future cluster cooperation have been analyzed. It turns out that the majority of the companies have not been involved in a cluster so far. Unfortunately, the majority of the analyzed SMEs do not have any intention to start cooperation with any cluster.

The above results show that it is necessary to start intense activities destined to increase the Baltic Sea Region SMEs' understanding of benefits resulting from

cooperation with scientific institutions, and the involvement in a cluster venture. Moreover, abolishment of the barriers identified in this study (mainly financial barriers) limiting both innovation implementation processes and SMEs' cooperation with scientific sphere is recommended.

Expected benefits SMEs can get as a result of their R&D cooperation with universities (in %)

	Poland	**Norway**	**Lithuania**	**Germany**	**Russia**
launching new products/services	38,1	44	62,5	50	81,8
enhancing products/services quality	21,3	60	54,1	50	63,6
optimalization of organization operations	20,1	20	37,5	43,7	45,4
improvement of cooperation with suppliers and customers	30,7	48	25	31,2	27,3
sales increase	33,8	52	58,3	25	27,3
improvement of competitive position	17,7	28	58,3	32,5	45,4
costs lowering	27,1	56	75	31,2	27,3
increase of ecological activity	7,8	24	41,6	18,7	x
increase of company's prestige	27,3	52	45,8	37,5	36,3
access to latest know-how	17,9	44	25	50	27,3
possibilities of new innovations implementations	16,1	16	62,5	31,2	27,3
possibilities of HR development	9,6	16	33,3	25	9,09
gaining new customers/increasing market share	30,2	40	45,8	25	45,4
increase of company’s profitability	17,2	52	45,8	25	27,3

In summary, innovation support measures for small and medium-sized enterprises must meet specific conditions of SMEs, in particular:

- SMEs do not have any in-house staff; they require comprehensive services that equal the staff performance of large enterprises, which would offset the size-related disadvantages.
- Services must be provided in closeness to companies and accurately according to specific needs.
- Services must be accessed by the SMEs precisely at the point in time when they are really needed. Services and information on stocks are not really helpful to SMEs.
- SMEs suffer from bureaucracy, they are time- and expense-sensitive. All thenecessary services must be provided without red tape, from a single source and must be cost-effective.
- Continuous exchange of information, stable foundation of trust, high reliability and continuity are important. This requires a permanent contact person.
- Services must be provided in the language of the SMEs and offer financial benefits to enterprises.

- Services must be of outstanding quality, match individual needs and need to be provided exactly at the right time.
- Services must encompass different areas like business administration, engineering, marketing, human resources, sales, etc. Of prime importance are also measures which promote international cooperation, because they create great potential, in particular for SMEs.

When universities and companies cooperate with SMEs within the framework of dual courses of study, this results in particularly intensive networking, direct technology and knowledge transfer and excellent opportunities for tailor-made research and development work, which is carried out in the company by students supervised by professors and lecturers.

3. Promotion of innovation in conjunction with further trainings and dual study programs

The innovation capacity of SMEs is most limited by the availability and skills of entrepreneurs, managers and professionals. Due to a lack of skills and entrepreneurs and employees, innovation in SMEs is already much lower than it could and should be. With the exception of Sweden, the number of younger people of working age in all Baltic Sea countries will fall by up to 25% over the next 15 years. At the same time, qualification requirements are increasing; human resource and social skills are becoming equally important alongside specialist knowledge. Improving qualifications and eliminating the shortage of skilled workers are the most important promotional task and the key to sustainably strengthening innovation, competitiveness and growth in SMEs. The realisation of further trainings and dual Bachelor's degree programmes, in which the studies are combined with relevant vocational training, makes a decisive contribution to mastering this challenge in order to attract the high demand for junior staff in innovative entrepreneurs, managers and professionals for SMEs and at the same time to emphatically strengthen innovations in SMEs.

3.1 Innovation promotion combined with continuing vocational training

The structural concept KAIN (Knowledge According Individual Needs), which consists of the following elements, is recommended for the implementation of shorter vocational training courses for SMEs:

- 2-3 learning phases with classroom teaching, delivered on two days per week, possibly Fridays and Saturdays.
- in between, longer on-the-job teaching periods at the trainees' workplace with simultaneous realisation of innovative development projects in SMEs, covering three to four months.
- Proposal for teaching periods at the trainee's workplace:
  a) coaching by same trainers that are also delivering classroom teaching,
  b) optional and customised e-learning options,
  c) implementation of a specific development project within the company, in the topic area of the respective advanced training, involving as many employees as possible, thus, ensuring joint team learning.

At the end of the first classroom teaching, one focus is on teaching relevant issues with regard to planning, implementation as well as to (critical) assessment of their own projects that are processed in the second part of the training. Thus, another key objective of this part of the training is to equip the trainee with critical impulses for processing the presented models and instruments in his individual project. In a sense, application and implementation of the presented models and instruments by trainees at their work constitutes the primary focus of the second part of the training concept.

At the beginning of the longer phase of learning on the job, the innovative development project to be realised is defined and prepared in the company. The trainer accompanies the work to realise the development project in the company and involves other

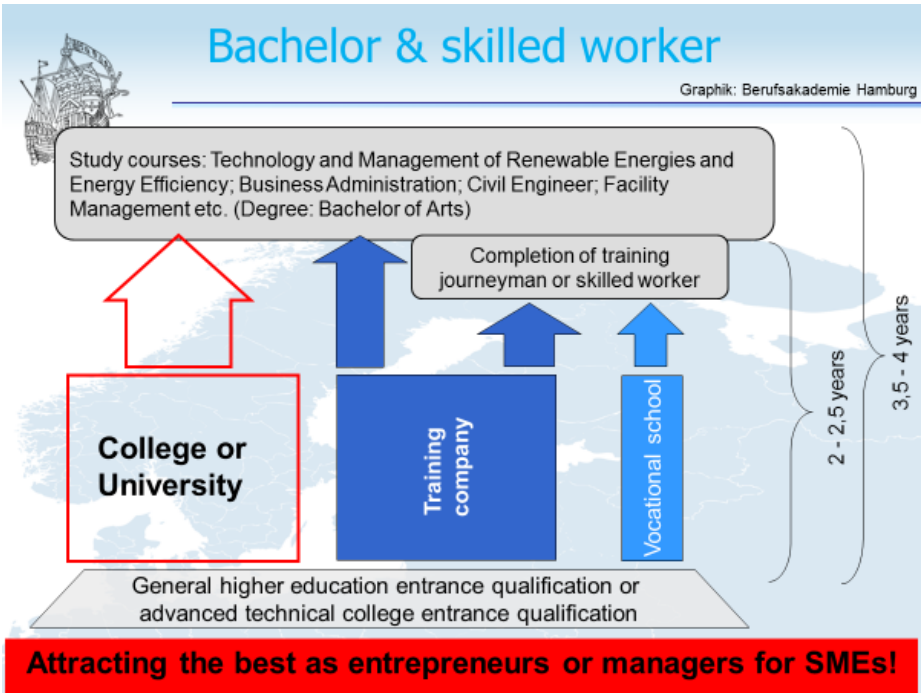
consultants and experts as needed. Support by trainers and consultants may vary, from a rather simple general advice in the sense of passing on relevant information up to an in-depth assistance-like coaching. Normally, it is advisable to decide on case-by-case basis which type of support is best suit-ed to enable each trainee achieving individual project goals.

In another classroom workshop, the third part of the training, experience and insight gained will be presented and exchanged at a joint event, in emphasis on presentation of individual participants` projects. Both, the trainees and the trainers, will be tasked to review and reflect on projects presented by the participants and to analyse answers with respect to a possible contribution to sustainable training target tracking.

Within the BA&VET project, two longer vocational training programmes are being developed and implemented that cannot be carried out using the KAIN method. Nevertheless, these two comprehensive further VET programs can easily be combined with innovation support and the implementation of manageable development projects. The prerequisite, however, is that the further VET programs are complemented by a coaching process that accompanies the development work in the companies.

3.2 Innovation promotion combined with dual Bachelor study program

Under dual study programs, close collaboration between academia and small medium-sized enterprises is achieved. In that regard, further welcome features are active exchanges of knowledge and experience as well as implementation of manageable research and development tasks for and by SMEs. Students will implement their semester or bachelor`s theses at companies where they complete their practical training. They will select topics that are particularly business-relevant, thus ensuring notable benefits to SMEs.



A dual bachelor study program is composed of the following basic elements:

- Admission requirement: higher education entrance qualifications (i.e. A-levels) or advanced technical college certificate.
- Duration: 3 to 4 years maximum (depending on subject).
- About 50% of the educational period as practical training or professional activity in a company. Vocational education takes place in dual form in companies and vocational schools.
- About 50% of the educational period takes place at the university.
- Both parts of the training are coordinated with each other and are carried out in parallel. Theory can be taught in longer blocks (e.g. 3 months) or 3 days a week with shorter additional blocks.
- About 60% of the courses offered at the university are taught by full-time professors and lecturers and about 40% by practitioners from companies.
- The participants sign a contract for vocational education/activity with the company and a contract for study with the university.
- Degree: Journeyman/skilled worker and Bachelor.

The bachelor's degree also entitles the holder to follow a master's program at a university at a later date. However, the aim is that at least 80 % of the bachelor's degree holders should remain in the small and medium-sized business sector as entrepreneurs, managers or skilled workers and, building on their initial bachelor's degree, improve their skills within the context of ongoing continuing education.

The excellent qualifications acquired in the dual study programs are also decisive prerequisites for high innovations. In addition, the participating universities/colleges should also take part in practice-oriented research and development projects for medium-sized companies and thus promote innovations in the long-term. The study programs and innovation promotion are aimed at the identical target group, namely high-performing, medium-sized companies and their management personnel. As companies are always included in the dual study programs, there is direct cooperation between companies and universities, which can be used for knowledge and know-how transfer as well as for research and development work by companies. Research and development tasks can be carried out in various ways, for example

- Work as part of semester or bachelor theses of the participants/students
- Targeted individual assignments of the companies or consulting/know-how transfer by professors and teachers
- More complex projects with public funding (especially from the EU)
- Joint work on projects with several companies in one industry (industry association projects)

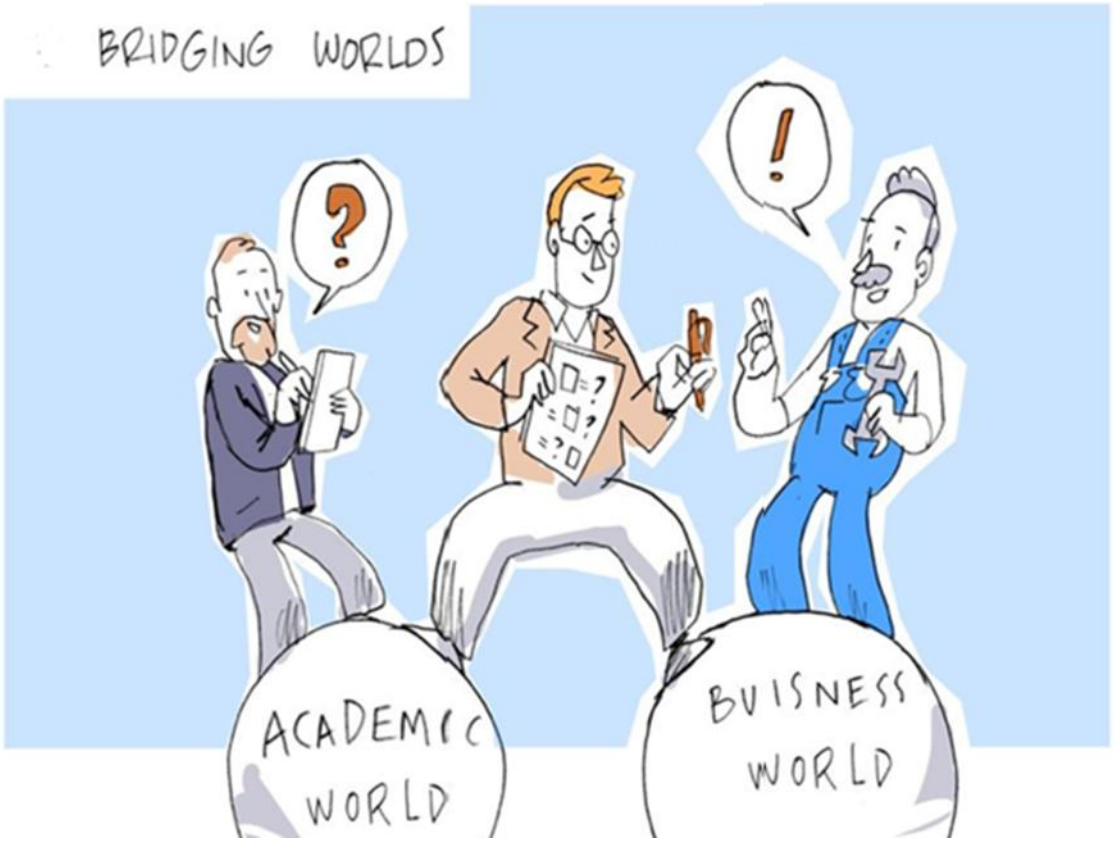
Universities and companies are training partners in dual study programmes. About half of the entire training period takes place at the university and half at companies. Credit points required for the Bachelor's examination are earned both during studies at the university and to a certain extent during training and work in the company. The change of qualification in the university as well as in the company can take place in block form (e.g. three-month blocks) or in daily form. The dual study programmes are Bologna-compliant and lead to a recognised Bachelor's degree. The qualification in the company can be combined with a vocational training with the degree "journeyman" or "skilled worker".

The close cooperation between universities and companies in teaching offers optimal conditions for the promotion of innovation by SMEs through universities. The following starting points and funding measures are particularly relevant.

a) The professors and lecturers of the universities must see themselves as equal partners of the companies. They must regularly visit the companies, check their innovation needs, provide advice, transfer new technologies, best practices, etc. and accompany implementation in the companies. The more effectively companies experience such innovation support, the greater their willingness to participate as training partners.
b) In addition to personal exchange and transfer, universities shall maintain a comprehensive written and electronic transfer. For example, regular publication of newsletters, innovation platforms, publications of prepared research results, dialogue forums, etc.
c) Approximately 60% of the teaching at the university is carried out by the academic staff of the university and about 40% by practitioners from the companies.

In connection with this, the practitioners should continuously bring the needs, topics and tasks of the companies for innovation development into the research and development work of the universities, so that an SME-specific orientation can be achieved. At the same time, through the participation of practitioners in teaching, entrepreneurial thinking, modern management methods, etc. can be transferred to the universities and thus future-oriented organization, administration, work processes, etc. in the universities.

d) Since the students spend half of their time in the university and half in the company, a personal transfer of knowledge, new technologies, best practices etc. from the universities to the companies can be optimal. Equally intensively, questions, concerns, tasks, etc. can be transferred from the companies to the universities via the students and the work of the universities in research and teaching can be stimulated and shaped in a way that is close to the company.



e) Topics and tasks for semester or bachelor theses should be formulated by the participating companies according to their innovation needs, which are processed by the students in the companies after review and approval by the university. This work process is accompanied by professors and lecturers in the companies who advise both the students and the companies on the development work and subsequent implementations. In this way, innovative tasks and manageable research and development tasks in the companies are realized in a targeted manner and without additional costs.

f) For the realisation of complex research and development tasks of SMEs, additional financial resources must be obtained. National, but also especially the EU innovation support programs are too bureaucratic for small businesses; the cost

of application and project management is in disproportion to the potential outcome of the project and is too much for many companies. Another obstacle to innovation is that SMEs cooperate too little in research and development, in contrast to large companies. Universities must therefore develop their role as an innovative service provider for the SMEs. They can advise companies on formulating project proposals, or even serve as an applicant's representative and project manager. Industry association projects with several SMEs should also be developed by the universities, applied for funding and carried out by the universities as lead partners.

During the testing of the two dual Bachelor programs in the BA&VET project, the above-mentioned innovation subsidies are to be implemented and tested at the same time. The focus is on the implementation of manageable research and development tasks (see e). During the course of the project, the trials of the study programs as well as the trials of the innovation support measures will be evaluated.