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Recommendations for qualification measures
targeting RTO

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Main author	Jennifer Bilbao (SEZ)
Contributors	Tomaz Lutman (JSI)
Quality Assurance	Alejandra Campos (SEZ)

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List of Abbreviations

CE Central Europe

EC European Commission

KET Key enabling technologies

RTO Research and Technology Organization

SME Small and Medium Size Enterprise



1. Executive Summary

This deliverable gives recommendations to Research and Technology Organisations (RTO), regional policy and the European Commission (EC) towards qualification of further RTO to be able to integrate them to the KET technology Inventory.

KET Technology Centers are research organisations that help companies to introduce new products to the market. That means, that annually they work actively with industry in the higher TRL5, TRL6, TRL 7 or TRL 8 in several projects.

Investment in research capital is essential to ensure that Central Europe has the best available resources to stimulate industrial growth. Industry benefits greatly from capital investment through access to advanced facilities as well as access to world-leading scientific and technical expertise. Therefore, KETGATE recommends concrete activities in four working areas: 1) Trainings and further education, 2) Mentoring, 3) Infrastructure and 4) Joint Initiatives

Technology centres, governments and policy makers are in a key position to help alleviate some of the problems faced by scientists working in applied research.



2. Introduction

During the project KETGATE many RTOs supported SMEs in CE to develop their innovation projects during pilots. This helped us realize, what are the characteristics of leading-edge technology centers and what are our recommendations to Research and Technology Organisations (RTO), regional policy and the European Commission (EC) towards qualification of further RTO to be able to integrate them to the KET technology Inventory.

3. KET Technology Centers

3.1. What are KET Technology Centers?

According to the EC, KETs Technology Centres help SMEs cross the 'Valley of Death' and go from lab to market to develop and produce new KETs-based products. They help companies reduce the time-to-market for new innovation ideas.

KETs Technology Centres are public or private organisations carrying out applied research and close-to-market innovation (Technology Readiness Levels TRL 3 to 8, not necessarily the whole range) in Key Enabling Technologies (KETs). These Technology Centres typically provide the following services to SMEs:

- Access to technology expertise and facilities for validation;
- Demonstration;
- Proof of concept / lab testing
- Prototype development and testing;
- Pilot production and demonstration/ pilot lines / pre-series
- Product validation / certification

3.2. KET Technology Criteria

Technology centres must comply with 3 qualitative criteria

- Provide services to industry and SMEs
- Be active in at least one Key Enabling Technology
- Be active in the higher Technology Readiness Levels (TRL) -have activities in TRL5, TRL6, TRL 7 or TRL 8

Technology Centres have to comply with at least 2 additional quantitative criteria among the following 4:

- More than 10 projects with SMEs in the last two years.
- More than 2 major investments in equipment for close-to-market R&D activities with industry in the last 3 years. The Centre should provide a short description of these investments (type, functionality and investment amount)
- At least 15% from industrial funding in the total annual funding of the Centre in the last 2 years.
- At least 7% from projects with SMEs in the total turnover of the Centre in the last 2 years.



4. Recommendations

Investment in research capital is essential to ensure that Central Europe has the best available resources to stimulate industrial growth, especially SME growth. Industry benefits greatly from capital investment through access to advanced facilities as well as access to world-leading scientific and technical expertise. Therefore, KETGATE recommends concrete activities in four working areas: 1) Trainings and further education, 2) Mentoring, 3) Infrastructure and 4) Joint Initiatives

4.1. Training and further education

Scientists in applied research are the shapers of innovation. However, they are under more strain than ever before, with mounting job insecurity and ever-increasing pressure to not only have skills on the industrial areas of the future, but also on business models and management. Technology centres, governments and policy makers are in a key position to help alleviate some of the problems faced by scientists working in applied research. The most important training recommendations are described above.

4.1.1. English Language Training

Working on a European level demands mastering English to be able to communicate faster with your customers. For that reason, it is essential, that technology centres offer English courses to their employees, especially the courses oriented to professionals and scientist.

4.1.2. Training on Business Skills

To be able to support a company to put a product into the market, it is not enough to be a technological expert. It is imperative, that scientist also understand and use business language, and can implement business concepts to their developments. Some courses recommended by KETGATE are:

- Business model development
- Product profitability
- Equity finances
- How to pitch in front of investors?
- Acquisition skills: how to approach industrial clients?

4.1.3. Training on Industry 4.0

The trend towards industrial automation and Industry 4.0 will change production significantly in the future. Therefore, it is imperative to ensure that scientists are highly skilled in the principles of automation and Industry 4.0. Scientists need to be highly competent in using such instrumentation, be adaptable to different types of equipment and be able to interpret results that may significantly enhance industry competitiveness. Some relevant topics to meet the challenges, that production companies will face in the future are:

- Introduction to Automated Production Systems
- Sensors, Controls and Drive Technology
- Handling Systems and Industrial Robots



- Automated Quality Control
- Manufacturing and Assembly Technology
- Multi Machine Systems
- Design and planning of automated production facilities
- Use Cases: Industry 4.0 in Industry

Learning by doing and using are the principal drivers of incremental innovation. In almost all fields of production of goods and services, the repetition of production tasks leads to a gradual improvement in the efficiency of production processes and product/service design and performance. The importance of such ‘learning by doing’ processes has long been recognised, as has the central place of direct production workers in innovation as sources of work-based learning. Such work-based learning is highly recommended by KETGATE. This can be done in learning factories or fab labs.

4.2. Mentoring

Mentoring is a relationship between people or organisations with different levels of experience. Its main goal is to enable learning and growth. The more experienced mentor guides the mentee for a certain duration of time. It was proved during KETGATE that mentoring is a great tool for unexperienced RTOs to learn how to work with SMEs and understand their needs. In KETGATE, this mentoring will be further promoted, so we all members can benefit by working with SMEs and complement each other.

4.3. Infrastructure

CE research community requires a range of leading-edge capabilities and technologies to support its research programmes to serve SMEs. The most important infrastructure needed are described below:

4.3.1. New and transformative equipment for world-leading research

Early acquisition of new and transformative equipment is a major requirement of the research base to maintain research and innovation capability. Researchers require access to state-of-the-art instrumentation to underpin cutting-edge research and support industry to develop innovative products and services. Facilities in CE needs to invest in this area to retain, foster and develop their capabilities.

4.3.2. E-Infrastructure

In addition to keeping pace with necessary upgrades of laboratory resources, developments in instrumentation technology, IT and automation are producing a constant stream of new tools that transform the speed, resolution and accuracy at which research can be accomplished. Instrumentation in its broadest definition is a key building block of collaborations at a multidisciplinary level - where ground-breaking technologies that change how we live and interact are often discovered - and more importantly, at the industrial level, where exploratory research is required to overcome commercial challenges.

Moreover, research across a wide range of disciplines requires an ecosystem of computational resources (e-infrastructure) that can allow distributed collaboration and computation, large scale simulation and analysis, and fast access to data and facilities. Investment in infrastructure to capture data flows, convert data to information and derive new knowledge and understanding will liberate the potential of ‘big data’ to benefit business, provide better public services and to advance research.



4.4. Joint Initiatives

In order to meet the challenges of today's and tomorrow's innovation systems, it is not enough to simply stay on top of existing approaches to innovation research; we also need to explore new, cross-disciplinary avenues. With this in mind, KETGATE recommends the following activities to improve the services offered by RTOs for SMEs in CE:

4.4.1. Excellence through complementarities and synergies

KETGATE recommends RTOs to create a distinct scientific profile to encourage collaboration aimed at dovetailing excellence in applied research for SMEs. Therefore, KETGATE will support RTOs to promote the competitiveness and stellar scientific achievements of all its RTO members. At the same time, KETGATE strives to forge new paths in innovation research and integrate complementary competencies within the network to better support SME to solve technological challenges

4.4.2. Visibility through transparent competencies and services

According to the point above, KETGATE recommends that all RTOs in the network creates a profile of competences, services and infrastructure that is visible to all members in the network. KETGATE thus serves as a central point of contact for its target groups and enhances the visibility and transparency of the services provided by the various RTOs.

4.4.3. Future orientation through cooperation and agenda setting

Moreover, KETGATE recommends making common strategies among the RTO members to be able to identify future-relevant challenges and technological developments early on and expand their services portfolio in the field of innovation research to reflect the new demands. KETGATE will facilitate this process by acting as a central point, where strategic approaches will be discussed regularly.

5. Conclusions and Recommendations

Investment in research capital is essential to ensure that Central Europe has the best available resources to stimulate industrial growth. Industry benefits greatly from capital investment through access to advanced facilities as well as access to world-leading scientist with the high-quality skills. Therefore, KETGATE recommended concrete activities in four working areas: 1) Trainings and further education, 2) Mentoring, 3) Infrastructure and 4) Joint Initiatives.

Technology centres, governments and policy makers are in a key position to help better qualify scientists working in applied research, to invest in the much-needed cutting-edge infrastructure and to work on joint initiatives to shape the future of industrial innovation.

We strongly recommend the RTOs in the network and the newcomers to stay in active discussion with their management, regional and EC policy makers to be able to put apply these recommendations.