

Annex 5. Skills promotion & innovation Action Plan

Annex to the E1.3.1 TWIST Common
Strategy for mutual learning and
capitalisation of RIS3 results

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List of acronyms and abbreviations

EU - European Union

FET - Future and Emerging Technologies

ICT - Information and communication technologies

KET - Key Enabling Technologies

OCDE - Organisation for Economic Co-operation and Development

R&D&I - Research, development and innovation

RIS3 - Research and Innovation Smart Specialization Strategies

SME - Small and medium enterprise

TWIST - Transnational Water Innovation Strategy

EU - European Union



1. Introduction

The Transnational Water Innovation Strategy (TWIST) has framed the project and its goals within the European strategic and policy context and has set a strategic framework to execute the defined objectives.

The defined vision for the TWIST strategy is:

“A territory that is resilient to market and climate changes, that stimulates economic growth and environmental protection by being anchored in innovation and stakeholders engagement”.

In order to accomplish the defined vision, a mission and four strategic objectives have been set as showed on Figure 1.1.

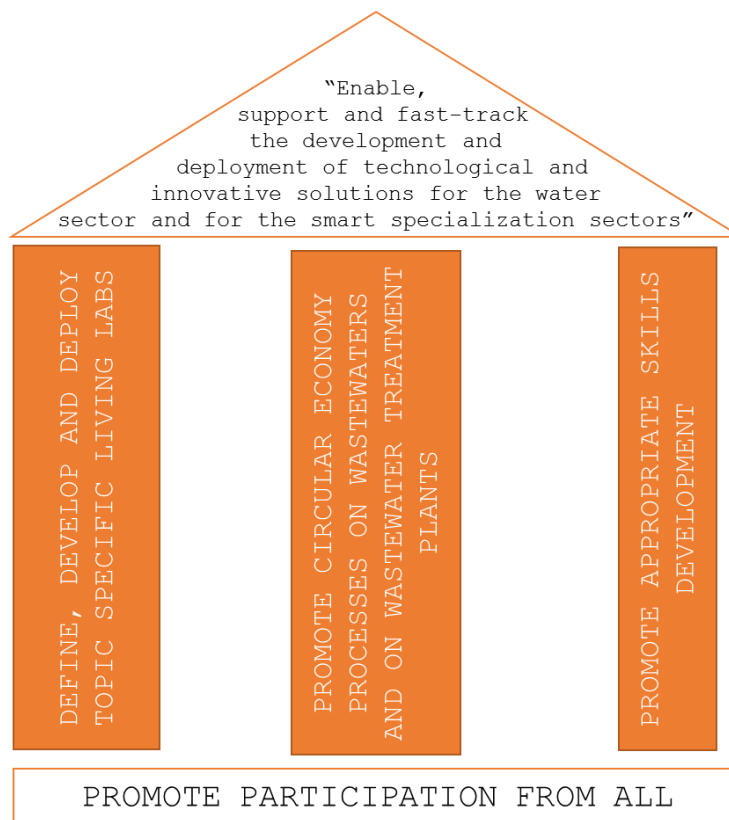


Figure 1.1 - TWIST Mission and Strategic Objectives



It is therefore aimed for the strategy to become an engine for innovation of the water sector within the TWIST regions using as leverage the Research and Innovation Smart Specialization Strategies (RIS3).

This Action Plan will define actions to promote appropriate skills development that are anchored in technological and/or organizational innovation and gives continuation to the Strategic Objective 3 of the TWIST strategy.



2. Skills and innovation

Innovation depends on people who are able to create and apply knowledge and ideas at education and research institutions, at their workplace and in the broader society. It is not only about “inventing new stuff”, but also understanding how to add value to existing structures, knowledge and ways of doing things.

There is a multitude of skills that can contribute to innovation that go beyond the traditional “hard skills” that can be learnt through training and education. In fact, “soft skills” are gaining importance and recognition in the labour markets and are related to traits such as problem-solving, strategic thinking or creativity.

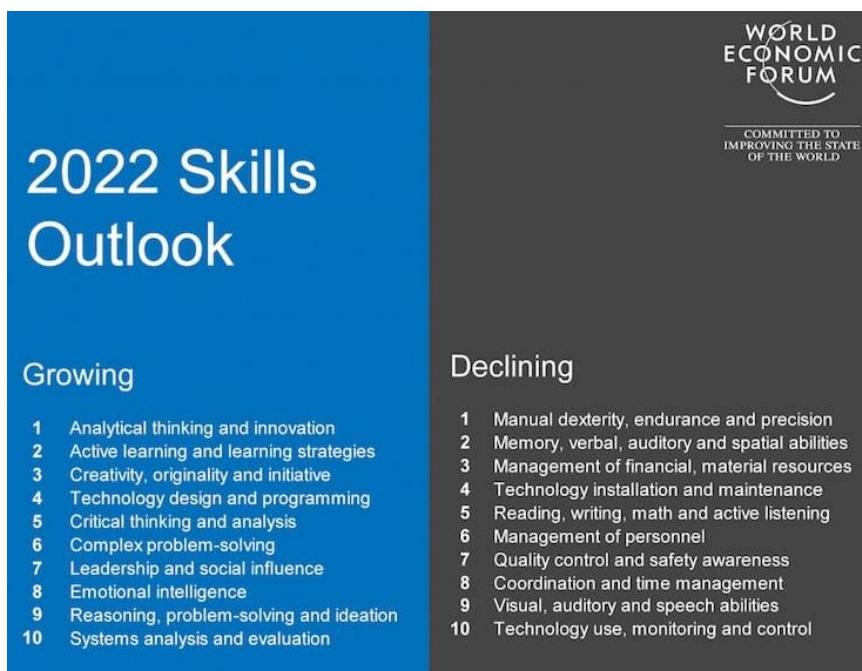
Nonetheless, the link between innovation and skills is not straight forward and easy to pinpoint. “The difficulty of measuring human capital and innovation outputs and outcomes, and the relative scarcity of innovation-specific empirical studies all serve to limit the identification of such relationships and thus the precision of policy messages” (OCDE, 2012) and decisions.

In addition, different activities need different sets of skills. Factors that can influence the needs are e.g., the stage of innovation, the type of innovation and industry structure.

With globalisation, the views of a single European market and a knowledge-based economy, soft skills such as communication and teamwork are gaining importance together with adaptability or ability to work in multidisciplinary teams. “The growing interest in environmental and sustainability issues is another trend that will have an impact on the set of skills for innovation and research” (OCDE, 2011).

Nowadays, skills development does not end with a university degree, and people are required to continuously seek an upgrade to their skills throughout their adult life. Training at workplace is also essential as it builds work-related competencies and contributes to the technological capabilities of enterprises being key on promoting innovation.

Figure 1.1 shows the trend on skills identified by the World Economic Forum at their report on the future of jobs.



Source: <https://www.innovationtraining.org/innovation-skills-for-the-future/>

Figure 2.1 - Growing and declining skills up to 2022

Skills mismatches and training issues have been identified by EU as a key challenge for socioeconomic growth. Progress in manufacturing technologies is likely to augment the demand for specific skills and training sets, cross-border cooperation and human capital mobility can become the best solution for an integrated and robust internal labour market, aligning skills supply with skills needs (skills-based matching) beyond regional or country wide boundaries.

This will require and active involvement of industries, SMEs and academia. Stakeholders at all levels should work to anticipate, plan and manage skills and training needs. Cross-border apprenticeships, traineeships and higher education exchange mechanisms should be implemented across and in between all TWIST regions. Since these changes are to be dealt mainly at regional level, regional public administration bodies should be actively involved on this paradigm shift, namely through supportive policy-making and financing instruments.



Skills development that match the current market needs will assist on meeting the inclusive growth 2020 objective by fostering a high employment economy and delivering social and territorial cohesion. In addition, the transnational business school to be created within the TWIST project will complement and reinforce the contribution of the project on skills development.

To bridge the skills gap training should be provided according needs, costs and relevance. OCDE recognises the following types of training:

- Formal learning is always organised and structured and has learning objectives. From the learner's standpoint, it is always intentional: i.e. the learner's explicit objective is to gain knowledge, skills and/or competences. Typical examples are learning that takes place within the initial education and training system or workplace training arranged by the employer. One can also speak about formal education and/or training or, more accurately speaking, education and/or training in a formal setting;
- Informal learning is never organised, has no set objective in terms of learning outcomes and is never intentional from the learner's standpoint. Often it is referred to as learning by experience or just as experience. The idea is that the simple fact of existing constantly exposes the individual to learning situations, at work, at home or during leisure time for instance;
- Non-formal training - mid-way between the first two and is rather organised and can have learning objectives. The advantage of the intermediate concept lies in the fact that such learning may occur at the initiative of the individual but also happens as a by-product of more organised activities, whether or not the activities themselves have learning objective.

There is a wealth of training methods that can be used to meet the needs according case-by-case particularities. They are:

- Instructor-led classroom training;
- Interactive methods;
- Hands-on training;



- Computer-based and e-learning training;
- Video training;
- Coaching and mentoring.

Some types of training require however a set of competences that older and/or employees with lower education levels may not have. This is especially relevant regarding ICT literacy.

European Union has defined in 2018¹, 8 key competences that considered essential for personal fulfilment and development, employability, social inclusion, sustainable lifestyle, successful life in peaceful societies, health-conscious life management and active citizenship.

- Literacy competence,
- Multilingual competence,
- Mathematical competence and competence in science, technology and engineering,
- Digital competence,
- Personal, social and learning to learn competence,
- Citizenship competence,
- Entrepreneurship competence,
- Cultural awareness and expression competence.

2.1 Skills and R&D&I in the water and wastewater sector

The sustainable development goals, the transition to a circular economy that is focused on energy and resource efficiency and on reusing and recovering resources from wastewater, the recent identification of new emerging pollutants and the high costs of the treatment of wastewater demand the development of new technologies and ways of doing business. As such, skills upgrading, and new skills development are of utmost importance to face the diverse social, economic and environmental challenges that the sector faces.

¹Council Recommendation of 22 May 2018 on key competences for lifelong learning (2018/C189/01)



According to the European Union of National Associations of Water Suppliers and Waste Water Services², the main challenges for the water sector that will need more thorough research and knowledge in the next 10 years are:

- Protecting water as a vulnerable resource;
- Building an effective strategy to minimise the presence of micropollutants in the environment;
- Increasing the public understanding of the water sector;
- Responding to the growing impact of climate change on water;
- Giving water its value in the circular economy;
- Increasing the resource efficiency in the water sector;
- Fostering sustainable economic growth and creating jobs;
- Setting the right price for water services;
- Managing long term assets in a fast changing environment;
- Reinforcing the resilience of water services to security risks.

These challenges require a significant upgrading of skills and reinforce the importance of a close cooperation with the education and training sector and the industry.

The water and wastewater sectors need a wealth of different professions and skills in order to carry out their activities. They range from planning and design stage professionals up to the operators. It also includes human resources teams, marketing/commercial specialists, IT personal, lab technicians, *etc.*

2.2 Skills development action plan

The European Technology Platform for Water (WssTP), since 2013 called Water Europe, has identified the main general actions to improve education of the wastewater sector:

- New education and training programmes for an upskilled workforce in the future digital water sector;

²<http://www.eureau.org/topics/10-big-challenges>



- Develop and deploy new, ad-hoc skills and training programmes for upskilled workers in digital technologies, managing authorities, water sector specialists, innovators, etc.;
- Creation of smart skill building tools for water and water-related sectors to facilitate replicability and applicability of water related technological solutions and facilitate capacity development;
- Talent building programme on Key Enabling Technologies (KET) and Future and Emerging Technologies (FET) for water and water in a circular economy;
- Vocational training for smart water systems, technologies, management / governance, and water economy;
- Shorter to medium term impact measures for education.

Together with the above list, the following actions are suggested to promote adequate skills that support and stimulate innovation in the sector:



ACTIONS	OBSERVATIONS	WHO	WHEN	HOW - Suggestions	Output
Understanding the context and existing environment					
A1 - understand the state-of-the art of the sector and future trends	National, European and international scales	TWIST partners	Before deciding and planning training activities	Based in TWIST Strategy and considering EU and country wide policy and strategic changes	
Demand side					
A2 - Create a portfolio of existing job roles and required competences and skills. As far as possible, try to identify the likely competences and skills that will be needed in the future especially considering the likely evolution of technology.	Ask the Human Resources department to assist on this task Consider impact automation and digital labour on workforce and	TWIST partners (per country)	When needed	<ul style="list-style-type: none"> • Meetings with country partners • Define the skills set per profile • Identify employment contract type and employees to be soon retired • Identify Key Enabling Technologies (KET) that are 	portfolio



	roles			<p>relevant to the industry and check if there is existing personnel that as the competencies required to work with KETs</p> <ul style="list-style-type: none"> • Identify planned investments (e.g. new equipment acquisition, new construction works planned) • Check the company business plan 	
Supply side					
A3 - Make an inventory of all education and training institutions in the region together with the industry-relevant courses offered	Courses that promote soft skills and/or organisational development should be included, as well as offer in	TWIST partners (one inventory per country) In	When needed	<p>Include universities, vocational/ technical schools, professional association and unions, private training companies</p> <p>Courses of TWIST transnational business school</p>	Existing educational offers inventory



	technology-based courses. Try to have an exhaustive list that can be shortened.	Portugal - PPA?			
Building capacity					
A4 - Promote skills development through regular apprenticeship, traineeships, fellowships and/or exchanges	This will stimulate new knowledge inputs	TWIST partners (per country)	When needed or, if feasible, every year	Consider issues such as: <ul style="list-style-type: none"> • Master degree thesis; • PhDs thesis; • Receive Erasmus students. These actions promote straightening relationships between universities and the industry.	
A5 - Consider on-the-job and in-house training	Utilise existing competences to integrate training into daily work	TWIST partners (per	When needed or, if feasible,	Develop and initiate 'train the trainer' courses to enable more-in-house training. Consider:	



	practice and projects	country)	every year	<ul style="list-style-type: none"> • Mentoring • Lateral transfers • Job rotation • Shadowing • Buddy schemes. 	
A6 - Look at neighbouring regions, nationwide and international, and web-based training offer that meets the skills demand that is non-existent within regional boundaries. Consider web-based training.	Identify and/or develop a suite of workshops and resources focused on building skills and capacity within the sector	TWIST partners (per country)		Develop a regional Training Working Group Consider the possibility to provide to employees training outside the region boundaries or the possibility to hire non-regional professionals to give in-house training	
A7 - Liaise with education and training institutions to promote the creation of courses that meet the industry needs	Establish training opportunities for new and emerging fields	TWIST partners (per country)			New courses