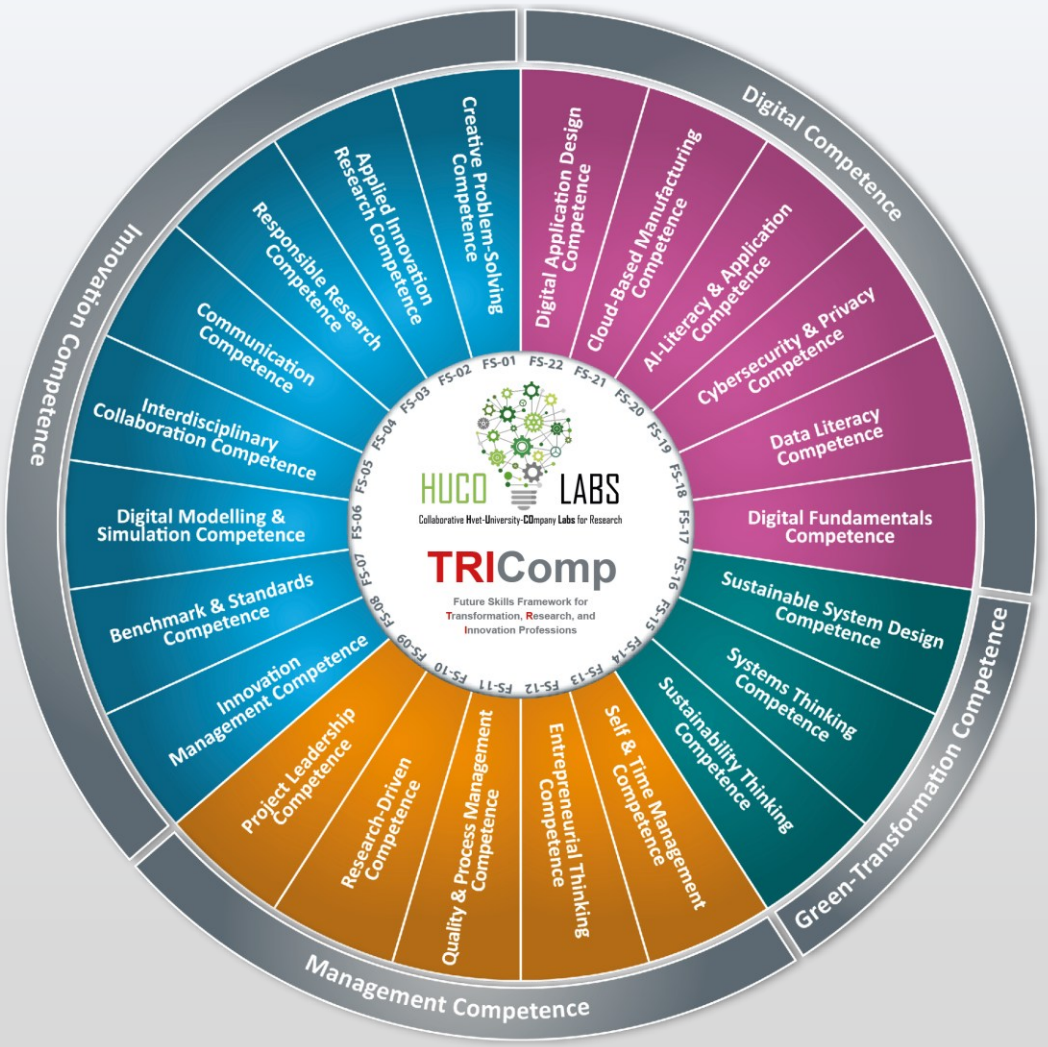
HUCO LABS
Collaborative Hvet-University-COmpany Labs for Research

Co-funded by the European Union

LONG-BRIEF

TRIComp

Future Skills for TRIProfessionals (mid-level technicians) in the Age of Interdisciplinary Innovation



SIMM ITS Academy A. Cuccovillo
COMAU
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Sunrise Tech Park
DHBW Duale Hochschule Baden-Württemberg
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Co-funded by the European Union. ERASMUS-EDU-2024-PI-ALL-INNO – **HUCO LABS** – Project number: **101186024** – Project duration: **Nov. 2024 - Oct. 2027**

TRIComp Ecosystem

TRIComp

The **TRIComp** Framework (**T**ransformation, **R**esearch & **I**nnovation **Com**petences) was developed within the European project **HUCO Labs.** It reflects real-world requirements for **TRIProfessionals** – from agile development and sustainable systems thinking to digital resilience – in technical, research-driven and innovation-oriented contexts. TRIComp serves as a future-proof competence model for education and training at EQF levels 5 and 6.

HUCO Labs

Future Skills for Technicians

HUCO Labs unites leading partners from vocational education, universities, industry, and applied research. Together, they strengthen Future Skills for mid-level technicians (EQF 5 & 6) at the intersection of transformation, research, innovation, and advanced technologies.

Based on a Europe-wide analysis of fragmented training approaches, HUCO Labs develops a unified competence framework and piloting pathways. A dedicated European platform will scale these efforts and foster collaboration through the creation of **"Technological European Villages for Technicians."**

More: www.hucolabs.eu

NEXT EDUCATION

NextEducation is an internationally active research collective based at the Baden-Württemberg Cooperative State University (DHBW). It focuses on teaching and research related to the transformation of educational organisations and processes, including teaching, learning, and lifelong learning in an increasingly digital world. In both international and national projects, it explores the future of educational institutions as well as learning processes

More: www.next-education.org

NEXT SKILLS

The NextSkills initiative started in 2019/2020 with the development of a German-language competence framework for Future Skills in higher education. Since then, regular empirical studies have been conducted across different sectors and domains to refine and apply the model. TRIComp builds upon this foundation and translates it into the context of technical, research- and innovation-oriented professional environments.

More: www.nextskills.org

Understanding Competences & Future Skills

Key Concept

Competences are dispositions to act – they describe the potential to act effectively in specific situations. Whether someone truly has a competency becomes evident only in real-life performance.

Core Components

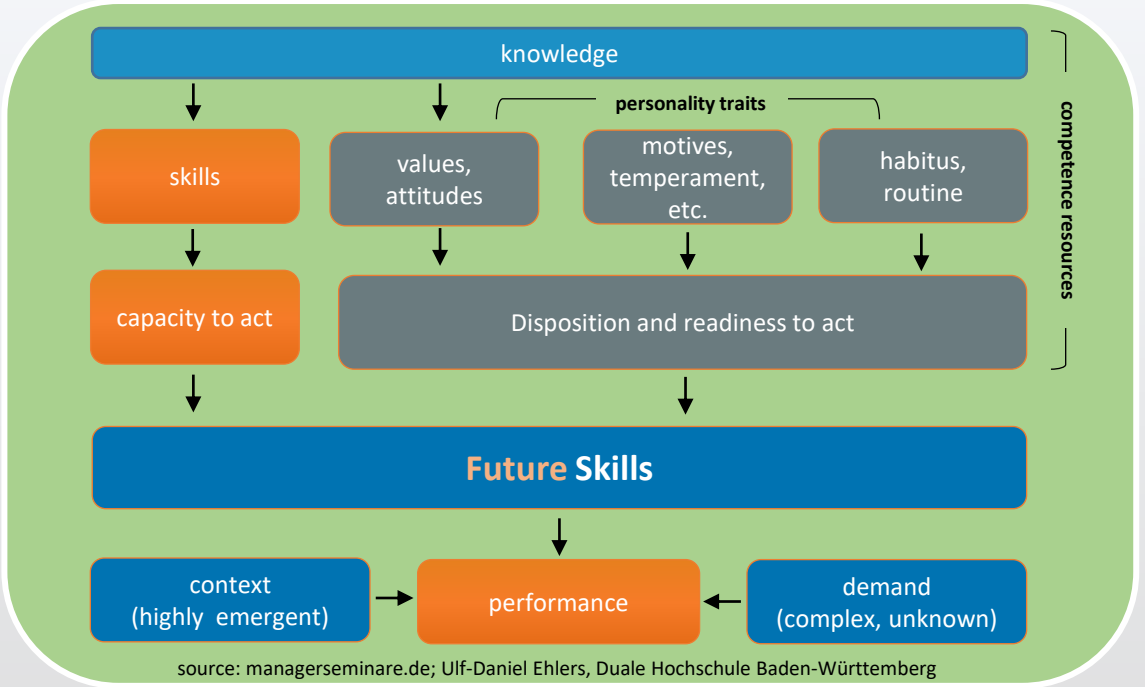
Competences combine **knowledge**, **skills**, and **attitudes/values**.

- *Knowledge + skills* form the **capacity to act**.
- *Knowledge + values* lead to the **willingness to act**.

Together, these shape personal and professional agency.

Future Skills

- future-oriented competences that prove particularly relevant in complex, evolving contexts.
- identified through methods such as expert interviews or job market analysis.



source: managerseminare.de; Ulf-Daniel Ehlers, Duale Hochschule Baden-Württemberg

Definition: Future Skills (Ehlers 2020)

"Future Skills are competences that allow individuals to solve complex problems in highly emergent contexts of action in a self-organised way and enable them to act (successfully). They are based on cognitive, motivational, volitional and social resources, are value-based and can be acquired in a learning process" (Ehlers 2020).

Example: Time Management

Time Management is not merely a retrievable skill. Rather, it is the **capacity** to organize oneself **responsibly and proactively** across different professional contexts – in a way that is appropriate to both the task and one's own well-being.
This appropriateness requires **value-based decisions**:
How do I use my time and energy? & What is truly important?
Such Future Skills go **beyond planning tools** – they rely on **self-reflection, discipline**, and an **inner attitude** shaped by **self-efficacy and responsibility**.

U.-D. Ehlers (2020), Future Skills, Zukunft der Hochschulbildung – Future Higher Education, https://doi.org/10.1007/978-3-658-29297-3_5

Learn more about Future Skills: www.nextskills.org

Ehlers, U.-D. (2023). Future Skills Framework. Kompetenzen für die KI-Welt. Heft 305. ManagerSeminare

Methodological Design

Origins

TRIComp was developed through a mixed-methods process: A review of six frameworks led to a 21-skill survey (150 participants, March–April 2025). 12 Expert interviews in five countries added one more skill. The final model includes 22 Future Skills in four core competence areas:

Innovation • Management • Green Transformation • Digital

Evidence to Skills

Step 1: Research Review

- 6 EU competence frameworks (**DigComp**, **GreenComp**, **AIComp**, **RECAPHE**, **NextSkills**, **EntreComp**)
- Theoretical foundation for skill selection
- Structure: 4 competence domains (Innovation, Management, Green Transformation, Digital)

Step 2: Survey Development & Quantitative Validation

- 21 Future Skills derived Online survey designed and launched from **March to April, 2025**
- **150 participants** from across the EU
- Target groups: VET, industry, applied research

Step 3: Qualitative Interviews

- 12 expert interviews conducted in 5 EU Member States
- Triangulation and in-depth review of the quantitative findings
- Additional insights led to the inclusion of **1 new Future Skill**
- **Final total: 22 Future Skills**

Outcome: Final TRIComp Framework

- **22 Future Skills**
- 4 strategic competence domains
- **KSA** (Knowledge – Skills – Attitudes)
- **Learning Objectives**

Why TRIComp – 4 levels of empowering

Competence Gap

As climate change, AI, and automation reshape the world of work, low-skill jobs are disappearing, decisions are shifting, and systems are becoming more complex. Yet most VET programs still rely on routine, siloed training and lack systems thinking.

Strategic Response

TRIComp provides the missing model – equipping EQF 5 & 6 professionals with the competences to lead Europe's twin transition from within.

Driving Transformation

TRIProfessionals are the skilled technicians, team leads, and process experts who rethink systems, navigate uncertainty, and drive transformation on the ground..

Level 1: Competence Areas

The model defines four key areas:
Innovation Competences, **Management Competences**,
Green Transformation Competences, and **Digital Competences.**
Forming the framework for future-oriented action in technical professions.

Level 2: 22 Future Skills

Each area contains several Future Skills (22 in total), each described and linked to learning paths, including KSA profiles and didactic objectives.

Level 3: Knowledge – Skills – Attitudes (KSA)

Each Future Skill is broken down into:
Knowledge (what to know), **Skills** (what to do), and **Attitudes** (how to approach and value).
This structure supports clarity and targeted competence development.

Level 4: Learning Objectives

Each skill includes learning goals at three levels:
1. Understand & recall
2. Apply & analyze
3. Evaluate & create

These guide teaching, training, and assessment.

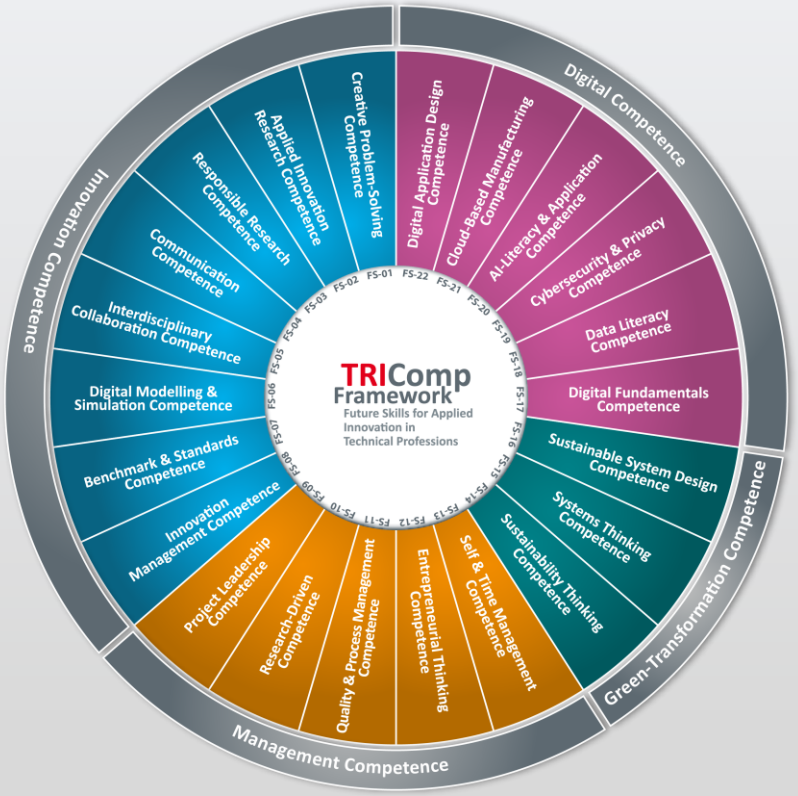
The Four Core Competency Domains of TRIComp

Innovation Competence

… refers to the ability of **TRIProfessionals** to systematically identify practical problems in technical environments and contribute to the development, testing, and implementation of innovative solutions. It builds on practical experience and combines structured creativity with applied research, ethical responsibility, interdisciplinary collaboration, and digital design skills. The focus lies on action-oriented learning, iterative prototyping, and the transformation of ideas and field insights into feasible, sustainable outcomes within **technical and vocational** contexts.

Management Competence

… refers to the ability of **TRIProfessionals** to plan, coordinate, and optimize technical projects and processes. It includes project and process management, quality assurance, evidence-based development, entrepreneurial thinking, and self-regulation. This competence supports effective goal-setting, workflow planning, risk awareness, and strategic alignment with innovation and organizational goals.



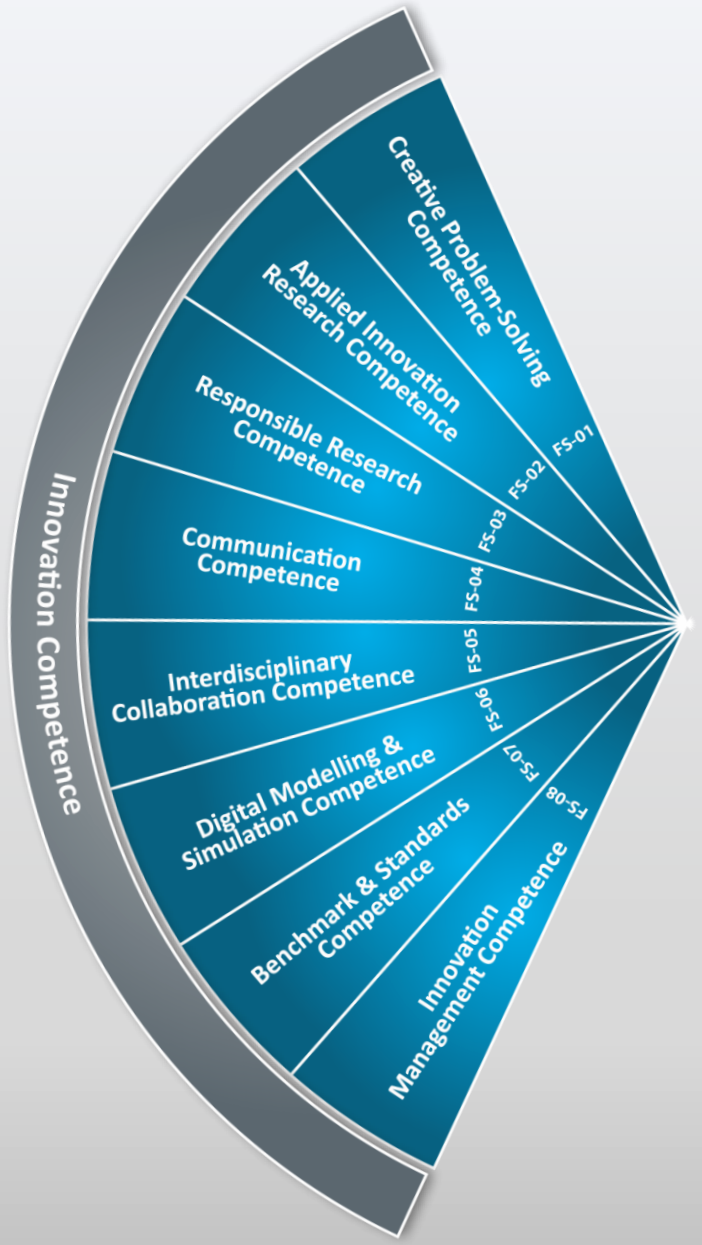
Digital Competence

… describes the ability of **TRIProfessionals** to navigate, apply, and adapt digital technologies in technical environments. It includes using standard software and interfaces, working with data for quality and decision-making, and addressing cybersecurity risks responsibly. **TRIProfessionals** are expected to understand and apply AI tools, operate cloud-based systems, and tailor digital solutions to technical workflows.

Green Transformation Competence

… is the ability of **TRIProfessionals** to assess and shape the environmental, social, and economic impact of technical decisions. It involves applying lifecycle thinking, analyzing sustainability trade-offs, and aligning actions with long-term ecological goals.
This competence includes understanding complex interdependencies in socio-technical systems, recognizing feedback loops and systemic risks, and designing solutions that integrate ecological principles, energy and material efficiency, and compliance with environmental standards.

Future Skills in the TRIComp Innovation Domain



Innovation Competence refers to the ability of **TRIProfessionals** to systematically identify practical problems in technical environments and contribute to the development, testing, and implementation of innovative solutions. It combines structured creativity with applied research, ethical responsibility, interdisciplinary collaboration, and digital design skills.

FS-01 **Creative Problem-Solving Competence**
Ability to identify practical problems in technical settings and develop innovative, feasible solutions. Involves structured methods, iterative work, and adaptability in real-world innovation.

FS-02 **Applied Innovation Research Competence**
Ability to plan and carry out applied research in technical and industrial contexts. This includes identifying questions, testing ideas through prototypes, and working in interdisciplinary teams to reflect and improve.

FS-03 **Responsible Research Competence**
Ability to conduct R&D responsibly and ethically. Involves data privacy, bias awareness, transparency, and alignment with societal and environmental values

FS-04 **Communication Competence**
Ability to communicate technical information clearly and collaborate across roles and disciplines. Encompasses verbal, written, and digital skills, active listening, and intercultural awareness for effective teamwork.

FS-05 **Interdisciplinary Collaboration Competence**
Ability to collaborate across disciplines in technical environments. Involves integrating diverse expertise, co-developing solutions, and fostering mutual respect and shared responsibility.

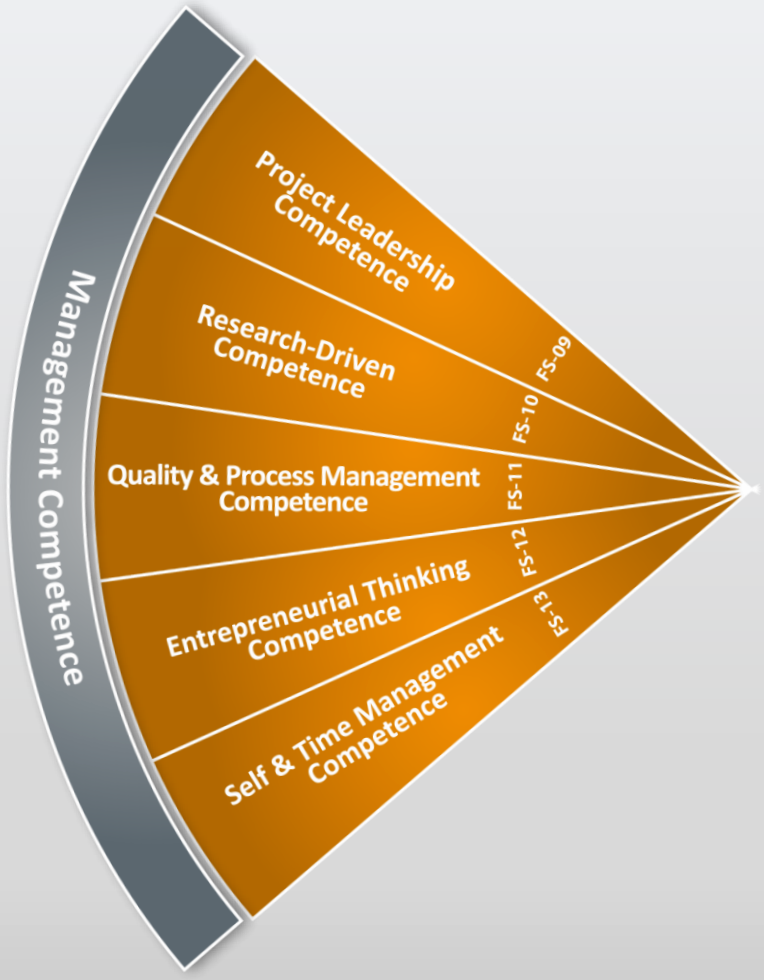
FS-06 **Digital Modelling & Simulation Competence**
Ability to use digital tools to design, model, and simulate technical systems. Supports virtual testing, informed decision-making, and cost-effective prototyping.

FS-07 **Benchmark & Standards Competence**
Ability to apply benchmarks, standards, and norms to guide technical performance. Involves using best practices and reference models to ensure quality, safety, and reliability.

FS-08 **Innovation Management Competence**
Ability to plan and manage innovation processes in technical settings. Involves setting goals, coordinating collaboration, and guiding ideas from concept to implementation.

*The competence definitions have been shortened for readability. Full descriptions can be found in the project report.

Future Skills in the TRIComp Management Domain



Management Competence refers to the ability of **TRIProfessionals** to plan, coordinate, and optimize technical projects and processes. It includes project and process management, quality assurance, evidence-based development, entrepreneurial thinking, and self-regulation.

FS-09 **Project Leadership Competence**
Ability to plan, coordinate, and monitor technical projects. Involves goal-setting, resource management, and team collaboration to ensure efficient and strategic outcomes.

FS-10 **Research-Driven Competence**
Ability to drive research-based processes within technical projects. Involves identifying knowledge gaps, applying scientific methods, and linking practice with evidence-based innovation.

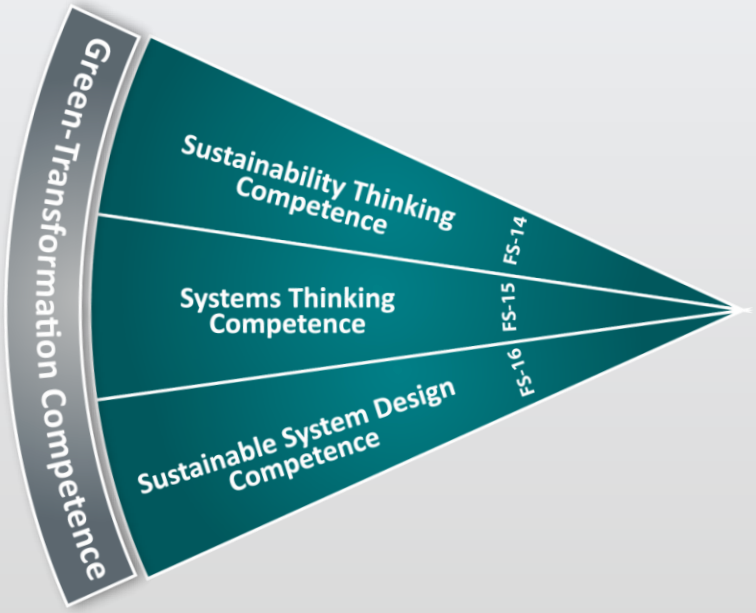
FS-11 **Quality & Process Management Competence**
Ability to manage and improve technical processes and quality frameworks. Involves workflow planning, performance monitoring, and aligning efficiency with evolving quality standards.

FS-12 **Entrepreneurial Thinking Competence**
Ability to identify opportunities, assess risks, and support value creation in technical contexts. Involves proposing improvements and aligning technical work with strategic and economic goals.

FS-13 **Self & Time Management Competence**
Ability to reflect on one's behavior and manage oneself in learning and work contexts. Involves self-organization, responsibility, and acting with initiative.

*The competence definitions have been shortened for readability. Full descriptions can be found in the project report.

Future Skills in the TRIComp Green-Transformation Domain



Green-Transformation Competence is the ability of **TRIProfessionals** to assess and shape the environmental, social, and economic impact of technical decisions. It involves applying lifecycle thinking, analyzing sustainability trade-offs, and aligning actions with long-term ecological goals.

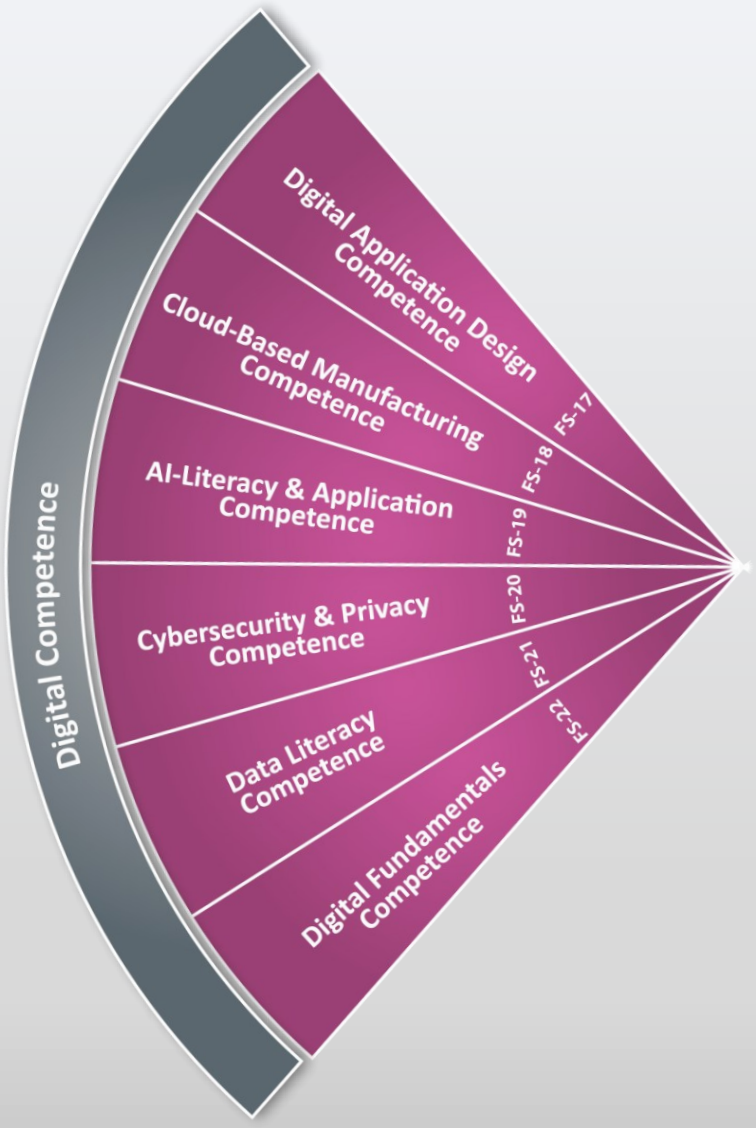
FS-14 **Sustainability Thinking Competence**
Ability to assess the environmental, social, and economic impact of technical decisions. Involves lifecycle thinking, sustainability trade-offs, and aligning actions with long-term goals.

FS-15 **System Thinking Competence**
Ability to model complex interrelations between technical, organizational, and ecological systems. Involves recognizing feedback loops, systemic risks, and unintended consequences.

FS-16 **Sustainable System Design Competence**
Ability to design technical systems with sustainability and lifecycle impact in mind. Involves ecological principles, resource efficiency, and alignment with environmental standards.

*The competence definitions have been shortened for readability. Full descriptions can be found in the project report.

Future Skills in the TRIComp Digital Domain



Digital Competence describes the ability of **TRIProfessionals** to navigate, apply, and adapt digital technologies in technical environments. It includes using standard software and interfaces, working with data for quality and decision-making, and addressing cybersecurity risks responsibly.

FS-17 **Digital Fundamentals Competence**
Ability to use basic digital technologies in technical environments. Involves navigating interfaces, using standard tools, and understanding digital support for processes.

FS-18 **Data Literacy Competence**
Ability to interpret and use data in technical contexts. Supports quality assurance, process optimization, and evidence-based decision-making.

FS-19 **Cybersecurity & Privacy Competence**
Ability to recognize and mitigate digital risks in technical settings. Involves secure system use, data protection, and awareness of common threats.

FS-20 **AI-Literacy & Application Competence**
Ability to understand and responsibly apply AI tools in technical contexts, recognizing both opportunities and limitations. Supports diagnostics, decision-making, and automation through critical, informed AI use.

FS-21 **Cloud-Based Manufacturing Competence**
Ability to work with cloud-based systems in production environments. Involves connecting machines, monitoring workflows, and using cloud tools for efficiency and scalability.

FS-22 **Digital Application Design Competence**
Ability to design and adapt digital solutions for technical workflows. Involves configuring tools, improving usability, and aligning applications with practical needs.

*The competence definitions have been shortened for readability. Full descriptions can be found in the project report.

Access the Full Package: Info Sheets, Research & Learning Tools

All documents are clickable and lead directly to the corresponding files

Full Research Report (120-pages)

Citations and literature sources can be found in the Research Report

Short-Brief (4-pages)

Learning Objectives

Knowledge, Skills & Attitudes (KSA)

Description of Competences

Project Details & Contact

Learn more

https://hucolabs.eu
https://next-education.org/

Project

HUCOLabs – Collaborative **H**VET-**U**niversity-**Co**mpany **Labs** for Research*
“Future Skills for Applied Innovation in Technical Professions - The TRIComp Framework“

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