

EIT Manufacturing

Upskilling and Reskilling Quality System and Competency Model

Manual



Version History:

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Executive Summary

In 2022 EIT Manufacturing developed the EIT Manufacturing: Upskilling and Reskilling Quality System and Competency Model, which received the EIT Label. Activities selected through EIT Manufacturing Calls and other mechanisms develop content to upskill and reskill the manufacturing workforce with high quality learning programmes. The inclusion of these programmes under EITM Labelled portfolio, is determined by a panel of experts who assess them according to the Quality System and Competency Model.

A successful assessment and subsequent inclusion of an activity’s content under EITM Non-Degree Label Programme guarantees the content complies with the EIT Manufacturing Competency Framework and Quality System, including 7 Key Principles, at least three Overarching Learning Outcomes and at least one Red Area Competency. This content is named Label Track and comprises a collection of various asynchronous and/or synchronous content.

The final evaluation of the experts is the determinant stage to include upskilling and reskilling content in the EITM Non-Degree Label Programme. After which, the learners who consume this content can be counted for KPIs EITHE07.1 and EITHE07.2.

The aim of the EIT Manufacturing Competency Framework and Quality System is to increase the Skill Agility and reduce Skill Gaps in the European manufacturing sector, by providing employers, and individuals with a robust reference framework for relevant competencies, together with the associated education and training pathways to innovate, transform and create new business initiatives in the industry.

Manufacturing enterprises, and individuals can leverage in a One-Stop-Shop to address their up-skilling and re-skilling needs. They will be able to find specific skill-driven learning modules, or more comprehensive programs leading to the achievement of overarching learning outcomes and the award of the Label.

Depending on the call for proposals to which the consortium answered, the timeline and evaluation phases of the above-mentioned might vary. The process is described below in general terms:

TASK	LEARNING PROGRAMME MEMBERS INVOLVED	RESULTS
Activity proposed and selected for an EITM call or other	Consortium/Organization	Proposal includes 7 Key Principles
Content outline determining suitability for EITM Non-Degree Label Programme is defined. Learning Paths for synchronous and asynchronous training is detailed carefully on Skills.move platform.	Consortium/Organization High involvement of Instructional Designer is expected	Readiness of content outline (Intended Learning Outcomes, Assessment method, target audience, competencies) to be presented for evaluation
A panel of experts might evaluate the content outline to provide feedback.	None	Feedback from expert for best compliance of Quality System and Competence Framework.
Adjustments considering the experts’ feedback.	Consortium/Organization	Content compliant with the Quality System and Competency Framework has been well outlined.



	High involvement of Instructional Designer is expected	Ultimate selection of Tracks to be labelled, which quantity should be consistent with targeted KPIs EITHE 07.1 & 07.2.
Development of content Execution of pilots	Content authors, Instructional Designer, consortium/organization in general.	Training content is available for delivery.
A panel of experts evaluate positively the content and validate it with the EITM Quality System and Competency Framework. Execution of pilots	None	The Label Tracks are included in the EITM Non-Degree Label Programme
Final report	Consortium/organization	Only the learners who consumed the Label Tracks that were assessed positively by experts are counted for KPIs EITHE07.1 & EITHE07.2

It should be noted that learning programmes outside the EITM calls for proposals may apply for the label. In such cases, the timeline will be aligned with the timeline of the learning programmes under the call for proposals or a specific timeframe will be agreed. The evaluation phases will be those described above.



1. Introduction

In the manufacturing sector there is a wide offer of training on specific technical topics, and Business Schools for managers and executives. However, there is lack of comprehensive training programs that address skills for innovative technical solutions and intra-entrepreneurship. As a result, EIT Manufacturing is positioning the EIT Labelled upskilling and reskilling content for the successful transformation and development of the manufacturing sector and for becoming drivers and key contributors of global innovation and changes.

In 2022 EIT Manufacturing developed the Upskilling and Reskilling Quality System and Competency Model, which received the EIT Label. Since 2023, activities from EIT Manufacturing Calls have been selected to develop content to upskill and reskill the manufacturing workforce with high quality learning programmes. On one hand, the Quality System is a set of processes and procedures required for the selected activities to plan and execute training content, ensuring alignment with EIT Label requirements if included in the EITM Non-Degree Label Programme. On the other hand, the EIT Manufacturing Competency Framework also guides the funded activities and learning programmes to enable them to accomplish these requirements.

EITM awards a Learning Programme with the Label at **Label Track level**, which is understood as all possible combinations (including a sole course) among synchronous and/or asynchronous training activities that will conform to a track that a learner needs to go over to receive the labelled certification. These trainings could be Skills.move Learning Paths, workshops, Teaching Factories, Learning Factories, webinars, seminars, etc.

2. EITM Competency Framework

The EITM Upskilling and Reskilling Competency Framework is the guideline for activities and learning programmes to enable them to accomplish the requirements of the EITM Upskilling and Reskilling Quality System. These are the coverage of the seven EIT Key Principles, the coverage of at least a Red Area Competency (refer to section 2.2), and the coverage of at least three EIT Overarching Learning Outcomes (OLOs). This guideline is divided in three main steps described below.

2.1 Coverage of Key Principles

The primary evaluation at proposal stage of the Education Call for Proposals, or any other, assesses aspects that cover the seven Key Principles in the activity. Hence, it is assumed that all the selected activities foresee this coverage and plan their actions accordingly. For instance, fields already addressed in the proposal phase to *EIT Manufacturing Education Call* and related to the Key Principles, are the following:

- Consortia includes minimum 3 organizations geographically based in at least 2 different EIT Manufacturing CLCs and 3 different countries



- Specific partnership requirements depending on the call segment such as business schools or Innovation and Entrepreneurship Expert, Manufacturing Company(ies), incubators, Company academy.
- Innovative teaching and learning methodologies and approaches inclusion.
- Active involvement of Instructional Designer
- Overarching learning outcomes and type of final assessment definition
- Integration of an innovation and business perspective
- Foster innovation capacity in RIS countries. Hence, all proposals are required to have a minimum target for KPIs related to participants in these countries
- Address knowledge triangle integration and gender equality and inclusiveness

Before the Final Evaluation (refer to section 3,2), each activity declares the coverage of these principles using a template provided by EITM. Below are some examples on the type of evidence the activities will be asked to provide.

Key Principle	Guidance for sufficient evidence
Knowledge Triangle Integration	<ul style="list-style-type: none"> - Describe how education, business and research organizations collaborated in the creation of the learning program - State how many universities/VET-Schools, companies and research centres participated in the co-creation of the program (even if they were not part of the consortium) - Include the names and briefly describe the roles of such organizations - Explain how and what societal challenges are addressed with the learning program - Mention future/on-going research or papers that were benefited or related with the learning program
Innovation and entrepreneurship	<ul style="list-style-type: none"> - Declare which I&E competences are address with the learning program in line with eCompetence Framework, DigiComp, or EntreComp frameworks - Describe what methodologies are used to address such competences (e.g., use/business cases, industrial challenges, lessons, digital training, etc.)
Highly integrated, innovative, “learning by doing” curricula	<ul style="list-style-type: none"> - Describe how the curriculum of the learning program includes a "learning by doing approach" and provide examples of the "learning by doing" activities included in the program - Include information about the methodologies used and the type of learning activities included in the program
International engagement/exposure	<ul style="list-style-type: none"> - Explain whether the international engagement and exposure is done through virtual, in presence or blended actions - Explain how the learning program promotes innovation systems at local, national, regional and international levels - Declare how many international exposure opportunities the learners have when participating the program - Provide the nationalities and number of teachers, mentors, learners that participated (or are expected to participate) in these activities - In case of in presence training, include detail information about the location of the workshops and profiles of the teachers/trainers and learners



Inter-sectoral and inter-organizational experience/exposure	<ul style="list-style-type: none"> - Explain how the learners are exposed to inter-sectoral/inter-organizational environments, the value of this, and their internal motivation to participate - Declare what and organizations are involved in such activities and collateral benefits for them - Provide information about the methodologies used (e.g., Teaching Factories, Learning Factories, Summer & Winter Schools, Business seminars, internships, etc.)
Geographic inclusion	<ul style="list-style-type: none"> - Declare the countries of: the participating organizations, the trainers/teachers, the learners (differentiate between RIS and NON RIS countries) - If available, provide information about the number of learners per country - Provide information about the cities where the training was/is going to be provided, in case of in presence training - Explain how the learning program was disseminated through different countries and enabled registration from learners around Europe
Inclusion, diversity, gender mainstreaming & equality	<ul style="list-style-type: none"> - Provide information about dissemination activities done to foster female engagement in the learning program (e.g., reach to woman association, use of inclusive wording, mention schemes, use of gender balanced role models in the content developed) - Declare whether the learning program targets a group with specific learning needs - Declare how many women were/are expected to be involved in the program as teachers, trainers, mentors, learners. - Provide the percentage of women participation in the learning program

During the Final Evaluation Phase, and as a determining factor for an activity to be considered in the EITM Non-Degree Label Programme, the experts will assess the practical application of the coverage of the EIT Key Principles in accordance with the following definitions:

2.1.1 Knowledge Triangle Integration

The focus on societal challenges through the integration of the knowledge triangle distinguishes EIT from other EU innovation instruments. Co-creation and collaboration between education, business and research contributes to addressing these challenges. Integration with other Education activities could be found, such as with the Teaching Factory Competition and the Summer & Winter Schools.

Reference documents: Call guidelines; [Teaching Factory Competition Call 2023](#); Doctoral [Summer](#) & [Winter](#) School.

2.1.2 Innovation and Entrepreneurship

A training activity promotes – in a balanced way – both I&E content and components, it could also integrate with I&E dedicated modules/trainings. This requirement can be addressed by incorporating in the education activity Intended Learning Outcomes in line with the eCompetence Framework, DigiComp, or EntreComp frameworks, connected to relevant enabling technologies, manufacturing applications, and eventually business models.

Reference Documents: Call guidelines; [Entrecomp](#); [eCompetence Framework](#); [DigiComp](#)



2.1.3 Highly integrated, innovative, “learning by doing” curricula

The education and training provision is characterised by learning by doing, which refers to a hands-on approach where learners interact with their environment in order to adapt and learn. Typically, this entails solving authentic challenges articulated by the manufacturing industry and business partners and other non-academic partners, besides high involvement of instructional designer in all activities.

Reference Documents: Call guidelines, [Skills.move Handbook for Authors](#)

2.1.4 International engagement/exposure

The education and training provision embeds international engagement and experience, ranging from international mobility to exposure to the international environment. The learners can have international exposure through blended training (virtual or on-site), Teaching and Learning Factories experiences, Summer and Winter Schools. EITM Alumni community, among others.

Reference Documents: Call guidelines for consortium composition, [Teaching Factories Competition Call 2023](#), Doctoral [Summer](#) & [Winter](#) Schools; EITM Alumni community

2.1.5 Inter-sectoral and inter-organizational experience/exposure

The activity shall include inter-sectoral or organisational mobility in non-academic organisations, including business and industry, start-ups, the public sector, government, regulators etc. This could be complemented by collaborative projects with intense interactions between the learner and the external organisations. In executive and professional education, where participants are typically from industry, inter-sectoral and inter-organisational experience could entail exposure to cutting edge RDI and entrepreneurship outcomes. This could be achieved through the participation in Teaching Factories, Learning Factories, Summer & Winter Schools, Business seminar

Reference Documents: [Teaching Factory Competition Call 2023](#); Doctoral [Summer](#) & [Winter](#) School, Business seminar

2.1.6 Geographic inclusion

The European dimension and openness to the world must be embedded in the activity’s learners’ recruitment, programme content and programme partner selection. The EIT education and training activities will also increase their regional and local outreach to address disparities in innovation capacity and to promote knowledge and innovation dissemination across the Union. Special efforts will be made to enhance the participation of learners, teachers, and organisations from countries eligible to take part in the EIT Regional Innovation Scheme

Reference Documents: Call guidelines



2.1.7 Inclusion, diversity, gender mainstreaming & equality

Inclusion, diversity and gender equality are integrated in the design, implementation, monitoring and evaluation of the activity, in line with the EU policies on equality and anti-discrimination. Inclusion and non-discrimination shall be embedded in their provisions. Recruitment and enrolment policies, alternative pathways and recognition of prior learning are promoted in view of improving social inclusion.

University-school collaboration is encouraged to raise aspirations and improve the quality of learning and teaching, with special regard to learners from disadvantaged and under-represented backgrounds. In line with the EIT Gender Mainstreaming Policy, the gender perspective shall be integrated in the design, implementation, monitoring and evaluation of the activity, in order to promote gender equality and inclusion.

The activity should promote a gender responsive portfolio of education provision and balanced gender representation among education actors (learners, teachers, evaluators and decision makers) to address the current and anticipated skill shortages and demographic changes as well as the underutilisation of the skills and competencies of women (STEM studies, workforce and start-ups).

Reference Documents: Call guidelines, [EU policies on equality](#), [anti-discrimination policies](#), [EIT Gender Mainstreaming Policy](#)

2.2 Inclusion of a Red Area Competency

EITM Education Framework comprises two main competency areas: blue and red. Their description and the detailed competencies per area are defined as follows:

Blue competency areas – referring to the application of technologies for a purpose. Detailed competencies are included in Appendix 1.

- Digital Human Workstyle - competencies needed to jointly design and optimise cyber-physical-systems and human work taking into account a human-centric perspective, to work and learn in new ways in digitalized manufacturing environments.
- Flexible Manufacturing Systems- based on the technological backbone of Industry 5.0 and includes the competencies for the design, development, operation, monitoring and control, and maintenance of new technological systems.
- Resilient Value Chain - competencies needed for the digital transformation and innovation of product-services, industrial processes, value network and business models toward competitive and resilient manufacturing.
- Green Industrial Transformation - competencies needed for the successful transition toward a resource-efficient and circular manufacturing that minimizes negative impacts on the environment, and for the development of new clean industries fostering a climate neutral and circular economy.

Red competency areas – referring to transversal, innovation and business-related competencies:

- Problem solving – Define and analyse the problem space. Generate new solutions, assess their validity and co-create solutions.



- Critical Thinking – Find and validate relevant evidence and facts to drive decision-making, including constructive criticism about mainstream practices
- Communication and Leadership – establish effective interactions with others, listening as well as conveying complex concepts into wording and metaphors fitting for the interlocutor, inspire and mobilize others towards a goal.
- Intra-Entrepreneurship – recognize opportunities, initiate processes that create value, take up challenges, act and work independently to achieve goals, stick to intentions and carry out planned tasks to transform innovation into new products/services/businesses

Each Label Track that belongs to the programme **shall** include at least one competency from the Red Area, regardless of the Proficiency Level to which they belong. Content at Foundation Proficiency Level can complement a Label Track, but it won't cover any EIT OLO by itself and for practical purposes is not included in the EITM Competency Framework.

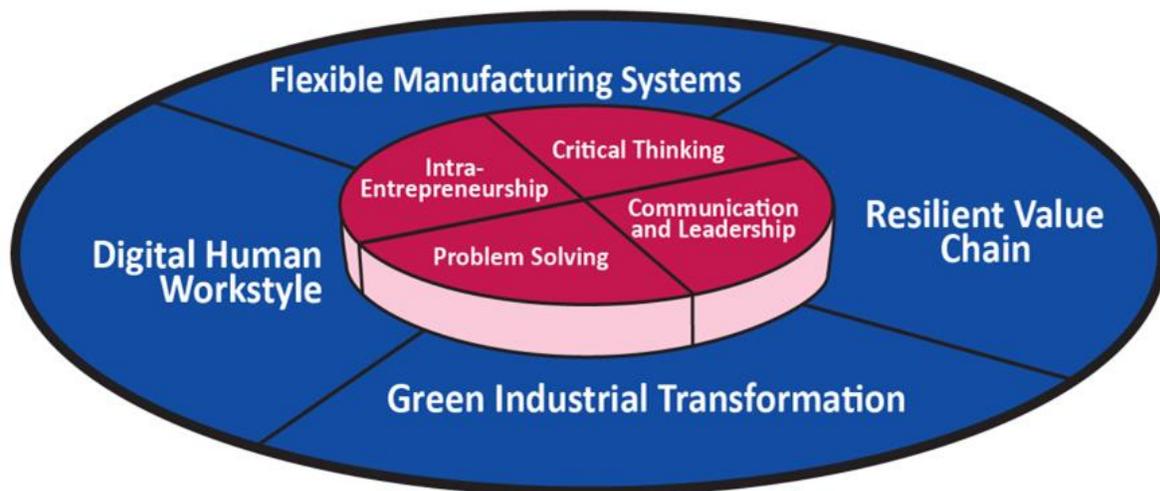


Figure 1: EITM Main Competency Areas

2.2.1 Proficiency Levels

A competency area is defined as a cluster of related knowledge, skills, autonomy, complexity and context that correlate with one's capability to perform tasks in a particular Proficiency Level. The EIT Manufacturing Competency Framework structures the levels as follows:



	KNOWLEDGE	SKILLS	AUTONOMY	COMPLEXITY	CONTEXT
Foundation Proficiency Level	Basic knowledge on innovative technologies, areas	Basic cognitive and practical skills	Autonomy, with support if needed	Perform routine tasks and solve routine problems	Structured and predictable
Intermediate Proficiency Level	Factual and theoretical knowledge in broad contexts	A range of cognitive and practical skills, <u>including value judgement and sustainability</u>	Independent / Self-management	<u>Innovative</u> solutions to specific and non-routine problems,	Usually predictable, but are subject to change
Advanced Proficiency Level	Comprehensive, advanced, knowledge <u>extended to business and ecosystem implications</u>	Comprehensive range of cognitive and practical skills, <u>developed creativeness</u> (out of the box thinking)	Guiding others	<u>Creative</u> solutions to abstract problems, complex technical or professional activities or projects	Unpredictable work context
Leader Proficiency Level	Highly advanced knowledge, at frontier and the intersection between fields	Advanced technical skills and multi-objectives decision making coupled with <u>multicultural skills, leadership, business skills.</u>	Providing strategic guidance, <u>develop new projects/initiatives/s tart-ups</u>	Solve critical problems, redefine and extend existing knowledge or professional practice	Complex, unpredictable context that requires new strategic approaches, multi-stakeholders' involvement

Underlined sections relate to the corresponding OLOs, refer to section 2.3.1

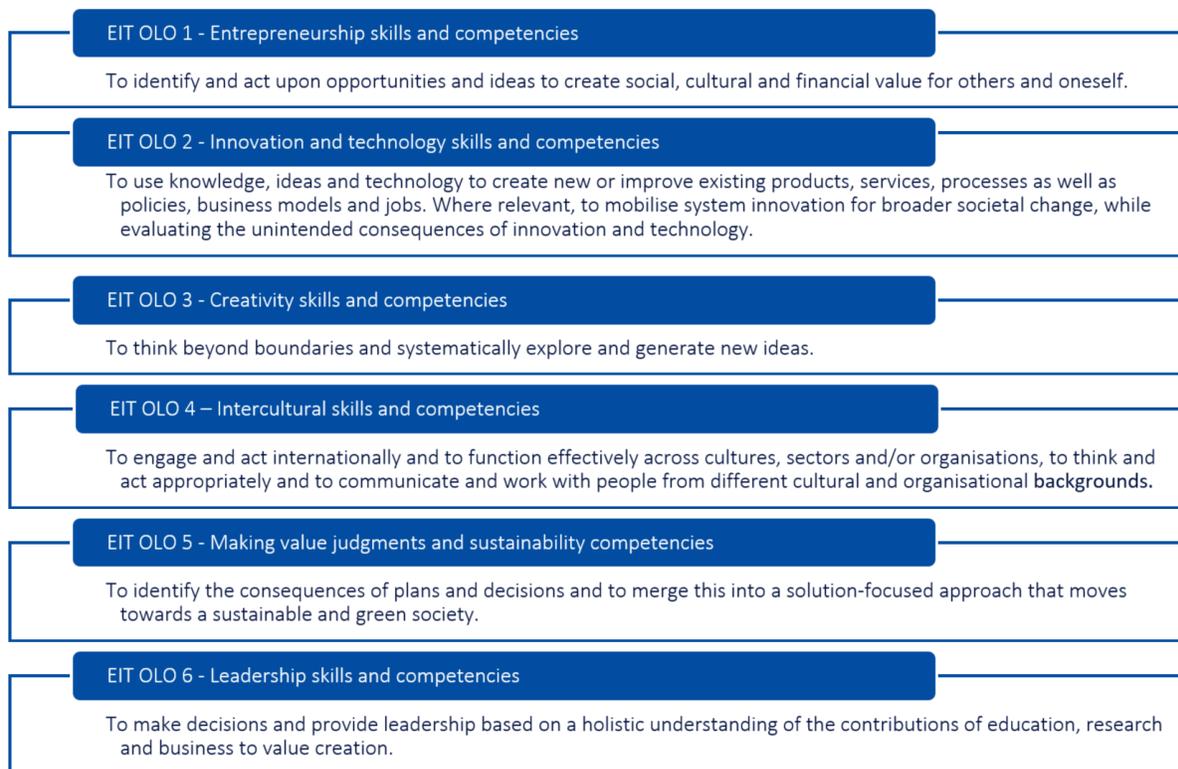
According to this cluster, different OLOs are delegated to each Proficiency Level in the EIT Manufacturing Competency Framework, as seen in section 2.3.1. Each competency can be developed at the different Proficiency Levels, an example of which is given in Appendix 2. The discrimination among these levels should be coherent with the Intended Learning Outcomes and the taxonomy used. In the case Bloom’s taxonomy is applied, as recommended in the [Skills.move Handbook for Authors](#), then the Intermediate Level would cover Understand/Apply taxonomic levels, Advanced Proficiency Level would cover Apply/Analyze/Evaluate levels, and Leader Proficiency Level would cover Evaluate/Create taxonomical levels.

The Foundation Proficiency Level includes basic competencies, which are not considered for the Label programme and not further explained in this manual. The Blue and Red Area competencies can be covered by any Proficiency Level. Note that Red Competencies can be covered independently in a unique training activity of a Label Track or on several of them.

2.3 Coverage of Overarching Learning Outcomes

Before defining the Overarching Learning Outcomes, it is necessary to clarify their difference from the Intended Learning Outcomes. At the time of planning its content, an activity will develop at its own discretion the Intended Learning Outcomes per training activity. These outcomes should be written according to the Skills.move - Handbook for Authors and are reviewed by the EITM Non-Degree Label Programme experts during their evaluation. the EIT Overarching Learning Outcomes (EIT OLOs) are six and are defined in the EIT label handbook:





A labelled upskilling and reskilling content will ensure learners achieve these outcomes demonstrating the programme has a strong focus on innovation, entrepreneurship, creativity, leadership and on shaping a sustainable society based on ethics and human values. According to the EITM Competency Framework, each Label Track should cover three or more OLOs.

2.3.1 EIT Manufacturing Competency Framework

The EIT Label Framework provides key principles and prescribes the EIT Overarching Learning Outcomes (EIT OLOs) to ensure that the EIT Label is consistently implemented across the KICs’ education and training portfolios, including Non-Degree education and training. Examples of possible combinations are found in Appendix 3.

As shown below, the EIT OLOs included in an Upskilling and Reskilling activity or learning program are determined by the competencies and Proficiency Level covered.

	OLO 1: Entrepreneurship skills and competencies	OLO 2: Innovation and technology skills and competencies	OLO 3: Creativity skills and competence	OLO 4: Intercultural skills and competence	OLO 5: Making value judgement and sustainability competencies	OLO 6: Leadership skills and competence
Foundation Pro. Level						
Intermediate Pro. Level		X			X	



Advanced Pro. Level		X	X		X	
Leader Pro. Level	X	X	X	X	X	X
PROBLEM SOLVING		X	X			
CRITICAL THINKING					X	
COMMUNICATION & LEADERSHIP						X
INTRA-ENTREPRENEURSHIP	X			X		

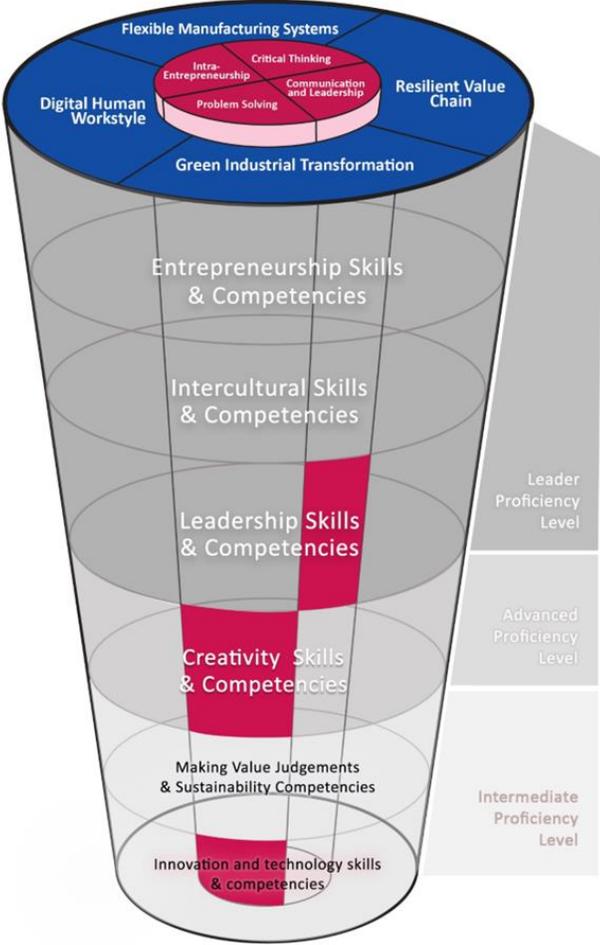


Figure 2 EITM Competency Framework

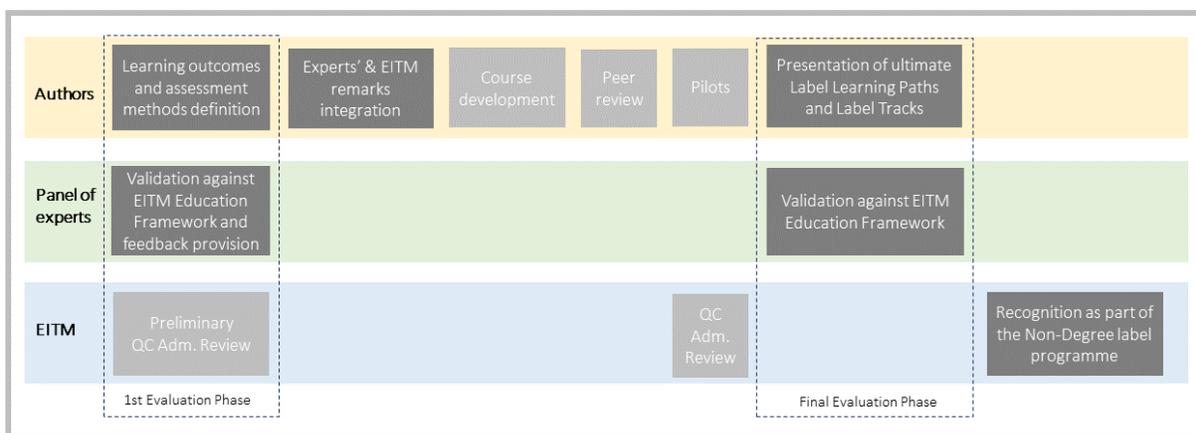


3. EITM Non-Degree Label Programme Quality System

This Quality System is the set of processes, procedures and requirements that ensure the planning and execution of activities' content is aligned with the Competency Framework and can therefore be included in the EITM Non-Degree Label Programme. The determinant part of this process is the Final (Second) Evaluation Phase, in which a panel of experts validates the content presented by the activities with the EITM Competency Framework. Following, there are further details of the complete process and its procedures.

3.1 First Evaluation Phase

The first evaluation phase of the EITM Non-Degree Label Programme Quality System consists of a panel of a minimum of three experts who assess the content outline of synchronous and asynchronous training courses. The content outline of each training is facilitated to the experts using the Learning Path structure on the Skills.move platform. The panel evaluates the compliance of the Intended Learning Outcomes, Fit-for-Purpose assessment, competencies, and target group description with the EIT Manufacturing Upskilling and Reskilling Quality System and Competency Model and provides their feedback for adjustments. Hereunder, a summary chart and the description of the evaluation phase process.



First, the experts receive the Learning Paths' content outline, which contains:

- Consortium name
- Learning Path ID



- Learning Path Name
- Short Description (optional)
- Summary (optional)
- Target Group Description
- Blue Area Competencies
- Red Area Competencies (optional)
- Proficiency Level
- 3 Intended Learning Outcomes
- Assessment Method

Experts will evaluate the information submitted on Skills.move, will not have access to any further information or context of the activity. The consortia or organisation should be sure that all relevant information is included on Skills.move.

Second, the experts determine whether the Label Tracks fulfil the parameters defined in the EITM Competency Framework (view section 2.3), validate the alignment of the targeted skills with the Proficiency Level, and ascertain whether the proposed assessment method is coherent and adequate. Experts will check and evaluate the following (though not limited to these):

- There is consistency and alignment among the Intended Learning Outcomes, Proficiency Level, competencies, assessment, and the OLOst
- The Learning Outcome includes an action verb (e.g., Bloom's Taxonomy) and describes the knowledge or skill
- The Intended Learning Outcomes are SMART (Specific, Measurable, Achievable, Relevant and Time Bound)
- The Learning Outcome has been appropriately expressed in clear English, free from grammatical errors
- Three or more EIT OLOs are clearly identified
- The Intended Learning Outcomes are consistent with EIT OLOs of the declared Proficiency Level
- The assessment concerns the 'object' under studying/training, and the assessment method reflects the competencies that learners/participants are expected to be able to demonstrate.
- The assessment method reflects the competencies that the learners/participants are expected to be able to demonstrate
- Assessment methods convince the learners/participants and other users of qualifications that the assessment is fit for purpose.
- Assessment methods used allow learners/participants to demonstrate advancement of their skills and competencies related to the specific EIT overarching learning outcomes within the KIC thematic area.
- The Intended Learning Outcomes are consistent with the selected competency area(s)
- The declared Proficiency Level is in line with the defined knowledge, skills, complexity, context and autonomy defined in the EITM Competency Framework
- The seven Key Principles are covered in a meaningful way and the evidence presented is clear
- The Target Group Description is well detailed, it is well aligned with the Intended Learning Outcomes and Proficiency Level. It includes prerequisites, a clear scope, and the audience's interests covered.

Third, the Experts Committee provide detailed feedback for the activities to adjust their content in compliance with the Quality System and Competency Model.

After this first evaluation phase, the activity will receive feedback from the experts to adjust their content in order to accomplish the EITM Upskilling and Reskilling Quality System and Competency Model. Subsequently, the ultimate



synchronous and asynchronous Learning Paths will be presented for the Second Evaluation Phase, which is mandatory to determine the inclusion of the content under the EITM Non-Degree Label Programme.

Successful completion of the first evaluation phase DOES NOT guarantee either inclusion of the content under the EITM label, nor KPI inclusion (EITHE07.1 or EITHE07.2).

3.2 Final Evaluation Phase

The general assessment timeline and the First Evaluation Phase will be set depending on the type of proposal that a consortium or organization presented. Please consult the relevant manager to know what applies to your specific activity. The Final (Second) Evaluation Phase is mandatory for all the educational content to be considered part of EITM Non-Degree Label.

The panel of experts participating in the final evaluation phase is independent of the previous evaluation phase, therefore activities must ensure to present stand-alone content. This phase takes place once content production process is complete. The Final Evaluation Phase is similar to the first one, excluding the feedback and adding the general review of ultimate Label Tracks to affirm that each of them cover the seven Key Principles, cover at least three OLOs, and a Red Area Competency. The decision of the panel of experts is final and no second round or follow-up is included.

Note that only the Label Tracks successfully completing this phase will be able to count the associated learners for KPIs EITHE07.1: Participants from EIT-labelled programmes and EITHE07.2: Participants from EIT-labelled programmes from RIS countries. In case the same activity produces content during different (annual) periods, the content developed in each period should be presented for evaluation independently.

4. Conclusion

The EIT Manufacturing Non-Degree Label Programme's content covers the seven Key Principles, at least three Overarching Learning Outcomes and at least one Red Area Competency. These requirements are validated by a panel of experts during two evaluation phases. A successful final evaluation guarantees the inclusion of the content under EIT Manufacturing Non-Degree Label Program.



Appendix 1: Blue Area Competencies

Areas	Competencies	Competency Description
Digital Human workstyle	Human Factor 4.0	Human Factors 4.0, referring to the understanding of interactions among humans and other elements of a system, and the application of theory, principles, data and methods to design in order to optimize human well-being and overall system performance.
	Work in digital era	Work in the digital era, which relates to new ways of organizing and working such as remote work, industrial smart working, virtual teamwork, agile organization, etc,
	Learn in digital era	Learning in the digital era, which relates to new ways of teaching and learning across the stages of life, especially those ones that are enabled by digital and other new technologies.
Flexible manufacturing systems	Advanced HMI (AR/VR/wearables)	Advanced Human-Machine Interfaces, such as augmented, virtual or mixed reality, and wearables.
	New production technologies (e.g., Additive manufacturing)	Additive Manufacturing, which refers to those technologies that, based on a geometrical representation, create physical objects by successive addition of material.
	Advanced automation and robotics	Advanced automation and robotics, which includes autonomous and collaborative robot systems.
	Digital twin and simulation	Digital Twins and simulation, which relate to digital representations of a physical system/process and the use of simulations that can predict how it will perform.
	Artificial Intelligence	Artificial intelligence, which relates to machines or algorithms capable of observing the environment, learning, and based on the knowledge and experience gained, taking intelligent action or proposing decisions.
	Cybersecurity	Cybersecurity, which refers to the body of technologies, processes, and practices to protect networks, devices, programs, and data from attack, damage, or unauthorized access.
	Industrial Big Data	Big data, which relates to data management, data engineering, data analysis, data visualization and computer science.
	Information Technology/Operations Technology	IT-OT integration, which relates to the integration of a range of components, from IIoT devices, control systems, platforms, communications networks, business applications etc.
Resilient value chain	Digital strategy and Business models innovation	Digital Strategy and Business Models, relating with the strategy formulation and implementation and new business models leveraging digital technologies.
	Digital transformation of manufacturing processes and systems	Digital Transformation of Manufacturing Processes and Systems, such as product-service design, engineering and lifecycle management, supply chain management, production, quality, maintenance, etc.
	Industrial resilience	Industrial resilience, which refers to the development of a higher degree of robustness in industrial production, by developing resilient strategic value chains, adaptable production capacity, flexible business processes, etc.
Green industrial transformation	Circular manufacturing	Circular manufacturing, which is based on designing out waste and pollution, keeping products and materials in use, and regenerating natural systems
	Energy and resources efficiency	Energy efficiency and climate neutrality, starting with the definition of company climate targets, through energy efficiency measures, to environmentally friendly energy and compensation of unavoidable emissions, etc.
	Eco-innovation	Open and Collaborative innovation to respond to sustainability challenges.



Appendix 2: Example of Proficiency Level differences under the same competency

An example description of one competency with its respective Proficiency Levels and the correct use of taxonomical verbs is included below:

Competency: Design of Human-Technology Interaction

Description: Planning and evaluation of human-technology interactions (human interactions with robotics and automation systems) in hybrid work systems, considering different tools, such as digital simulation software.

Foundation Level: Fundamentals of human-technology interactions

Capacity to **describe** the forms of interaction and design principles of human-technology interaction in industrial work systems and about human interaction with robotics and automation solutions in production and logistics areas. **Recognize** the skills to describe forms of human interaction with robotics and automation solutions according to specific characteristics and properties and to identify fundamental optimization potentials. **Classify** innovative solutions regarding human-centered and productivity-oriented workplace and work system design.

Intermediate Level: Planning of human-technology interactions

Description of methods, models and procedures for planning human-technology interactions in hybrid work systems. Recognition of hybrid work systems and conduction of ergonomics analyses manually, both prospectively and in relation to actual situations, to **identify** ergonomic stress situations and to **discuss** possible improvements. **Classification** of requirements along the human-technology organization concept for the integration of human-technology interactions regarding a human-centered and productivity-oriented workplace design / work system design. The implementation of principles, value judgements and measures also address fundamental aspects to ensure safety and security and sustainability. Demonstration of skills to derive requirements for the implementation of the planned human-technology interactions and document them in the form of specifications.

Advanced Level: Simulative planning of human-technology interactions

Implementation and **experimentation** of skills for digital and simulative planning of human-technology interactions. **Defend** innovative solutions and **test** workplaces and work systems with one or more human-technology interactions by means of CAD and simulation software systems and to use digital tools for the evaluation and analysis of ergonomic and productivity-appropriate work sequences, the division of labor between humans and robotics and between humans and automation solutions. **Question** requirements and possibilities for adapting technical parameters and properties of robotic and automation systems to improve human-technology interaction addressing software and hardware components. **Interpret** the derived requirements for the implementation of the planned human-technology interactions and **differentiate** them in the form of specifications, taking into account business and ecosystem implications.

Leader Level: Design of human-technology interactions

Evaluate human-technology interactions by using mock-ups for prospective usability and user experience analysis as well as for analyzing ergonomic stress situations of humans (e.g., motion capturing systems). **Distinguish, select** and subsequently **judge** specific studies for the implementation of usability, user experience and motion studies, in a multicultural setting. **Design** appropriate measures to overcome bottlenecks also **defend** better investment requirements and financial viability and **develop** its documentation. **Formulate** deals and **develop** networks with stakeholders, inspire others, **construct** platforms to mobilize resources implement new projects and initiatives.



Appendix 3: Possible combinations for Model compliance

Label Track covering Blue or Red Area competencies in:	EIT Key Principles covered	OLOs	Red area	OLOs	Total OLOs
Intermediate Proficiency Level	7	2 and 5	Problem solving	2 and 3	2,3,5
Intermediate Proficiency Level	7	2 and 5	Leadership	6	2,5,6
Intermediate Proficiency Level	7	2 and 5	Entrepreneurship	2 and 4	2,4,5
Advanced Proficiency Level	7	2,3,5	Leadership	6	2,3,5,6
Advanced Proficiency Level	7	2,3,5	Entrepreneurship	1 and 4	1,2,3,4,5
Leader Proficiency Level	7	1,2,3,4,5,6	Entrepreneurship	1 and 4	1,2,3,4,5,6
Exceptional cases	7	To be assessed on the bases of an additional test/submission of project work.			



Appendix 4: Label Track examples

These examples showcase the various ways label tracks can be configured, highlighting possible combinations and presentation formats. It is imperative that your label tracks exhibit consistency among EIT OLOs, Proficiency Levels, blue and red competency areas, and Intended Learning Outcomes.

Label track 1: LP234 (Advanced Proficiency Level, red area: Critical Thinking)

Label track 2: LP123 (Foundation proficiency Level) + LP456 (proficiency level II, red area: problem solving)

Label track 3: LP987 (Foundation proficiency Level) + LP657 (Intermediate Proficiency Level, red area: problem solving) + LP852 – synchronous workshop (Advanced Proficiency Level, red area: communication and leadership)

Label track 4: LP896 (Advanced Proficiency Level) + LP654 – Learning Factory (Leader Proficiency Level, red area: Intra-entrepreneurship)

These are label track for exemplary purposes ONLY, other combinations are possible.

