



Industry 4.0 Challenge:

Empowering Metalworkers For Smart Factories Of The Future

Erasmus+ Program KA2: Cooperation for innovation and
the exchange of good practices – Sector Skills Alliances
Project No 2015-1-LT01-KA202-013415

"Curriculum Guidelines for KETs and AMT", EASME/DG GROW of the European
Commission Expert workshop on "Aligning on-the-job training in Advanced
Manufacturing with the 21st Century needs"





, „The overall goal of the project is to tackle skills gaps of metalworkers by addressing the following objectives: to design and deliver a new targeted VET programme based on the current and future skills demand in the metalworking sector, and to develop a self-adaptive work-based learning system in combination with coaching.“



Over the last years the European manufacturing sector has engaged in a steady re-industrialisation of the sector, strongly leveraging ICT enhancements. In the light of the fourth industrial revolution (Industry 4.0) with its connected and flexible Factories-of-the-Future, CNC operators represent manufacturing's high-tech future.

Thus, CNC operators are
in high demand in the EU.

Participating members in Project 4change

I. National sectoral organisations

Engineering Industries Association of Lithuania, LINPRA, Lithuania
Education Network for the Northern German Metal and Electrical Industries, NORDBILDUNG, Germany

Association of Mechanical Engineering and Metalworking Industries of Latvia, MASOC, Latvia

Federation of Estonian Engineering Industry, EML, Estonia

II. VET PROVIDERS

Vilnius Jerusalem Labour Market Training Centre, VJDRMC, Lithuania
North Technical Academy, TAN, Germany

Zemgale Region Human Resource and Competences Development Centre, ZRKAC, Latvia

Tallinn Lasnamae School of Mechanics, TLMK, Estonia



Participating members in Project 4change

III. Accreditation, certification and qualification body

Qualifications and Vocational Education and Training Development Centre, KPMPC, Lithuania

National Centre for Education, VISC, Latvia

IV. Private enterprises

Baltec CNC Technologies JSC, BCT, Lithuania

MTS Mathematical Technical Software Development JSC, MTS, Germany

BCT

 **LINPRA**

 **VILNIAUS
JERUZALĖS**
DARBO RINKOS MOKYMO CENTRAS

MTS

 **TECHNISCHE
AKADEMIE
NORD**
Bildung ist Zukunft

NORDMETALL 

 **ZEMGALE REGION
HUMAN RESOURCE AND
COMPETENCES DEVELOPMENT CENTRE**

eml
EESTI MÄGINATÖÖSTUSE LIIT


Valsts izglītības satura centrs

 **MEHAANIKAKOOL**

 **KVALIFIKACIJŲ IR PROFESINIO
MOKYMO PLĖTROS CENTRAS**

 **MASOC**

The overall goal of the project

To tackle skills gaps of metalworkers by addressing the following objectives:

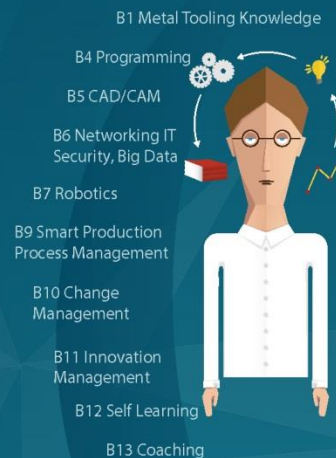
- to design and deliver a new targeted VET programme based on the current and future skills demand in the metalworking sector
- to develop a self-adaptive work-based learning system in combination with coaching



Educational products developed during this project can be used not only in VET but also during on-the-job training in manufacturing companies

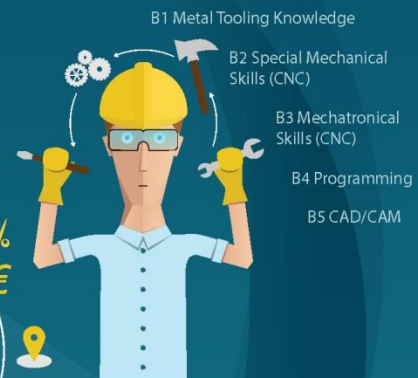
WHITE COLLAR

university degree of
mechanical engineering



BLUE COLLAR

VET education in
metal industry



NEW COLLAR

college degree in
smart production



Current and future skills demand in the metalworking sector will consist of these specific industrial requirements:

1

Advanced technology and digital skills due to increased need for engineers instead of manual workers;

2

Robotics and CNC operation skills due to technology-driven innovation;

3

Social and entrepreneurial skills due to need for highly motivated workforce to stay competitive;

4

Green skills due to promotion of energy efficiency.

Main activities in Project 4change

Making Comparative Analysis of Qualification Standards (QSs)

Drawing up a Model Qualification Standard and a Model VET Programme

Designing Training Material for Learners

Designing Training Material for Trainers

Development of E-learning Platform and Multimedia

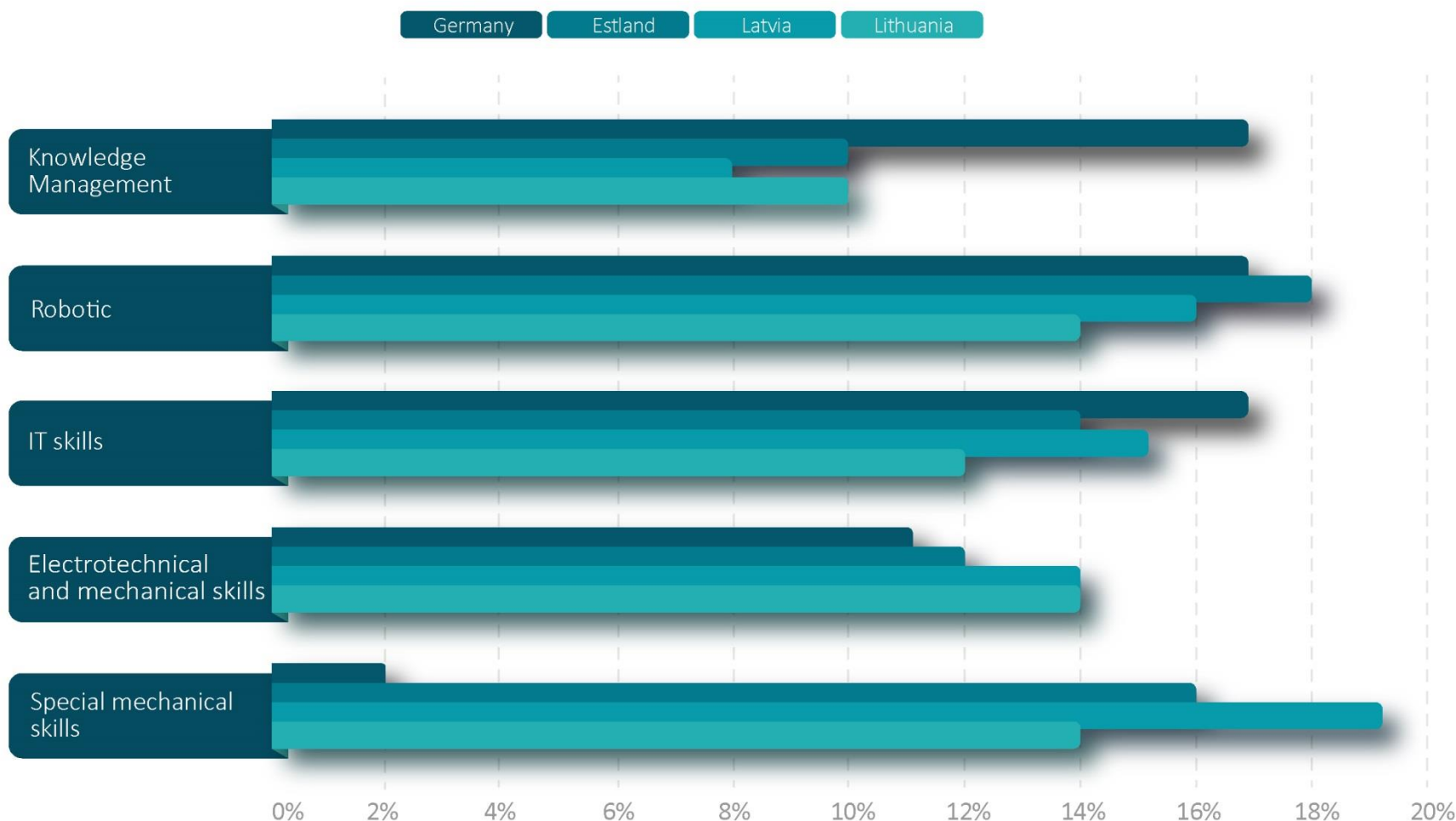
Piloting

Needs of qualification standards: cooperation between labour market and Educational system

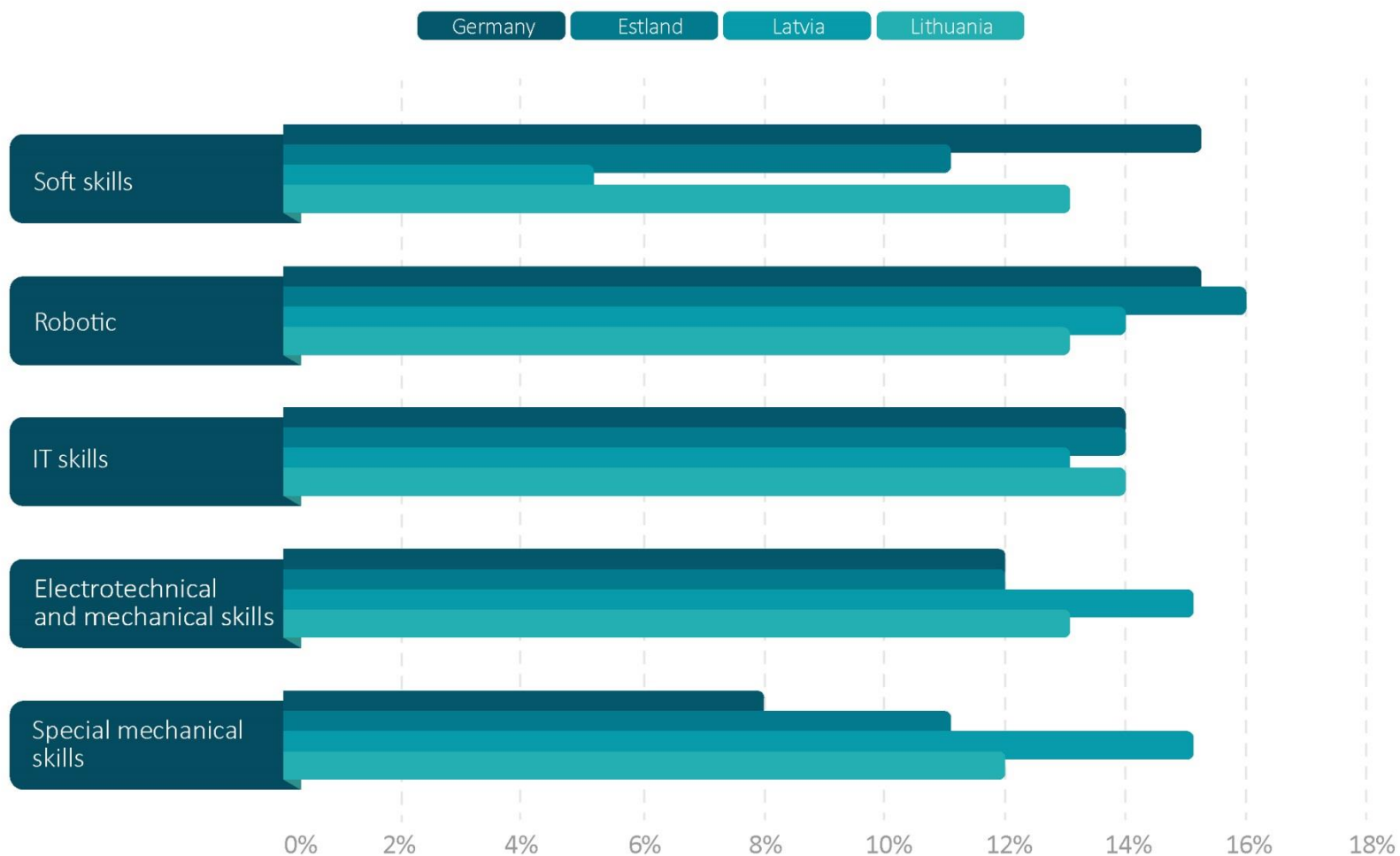


Survey performed in 80 manufacturing companies from Lithuania, Latvia, Estonia and Germany

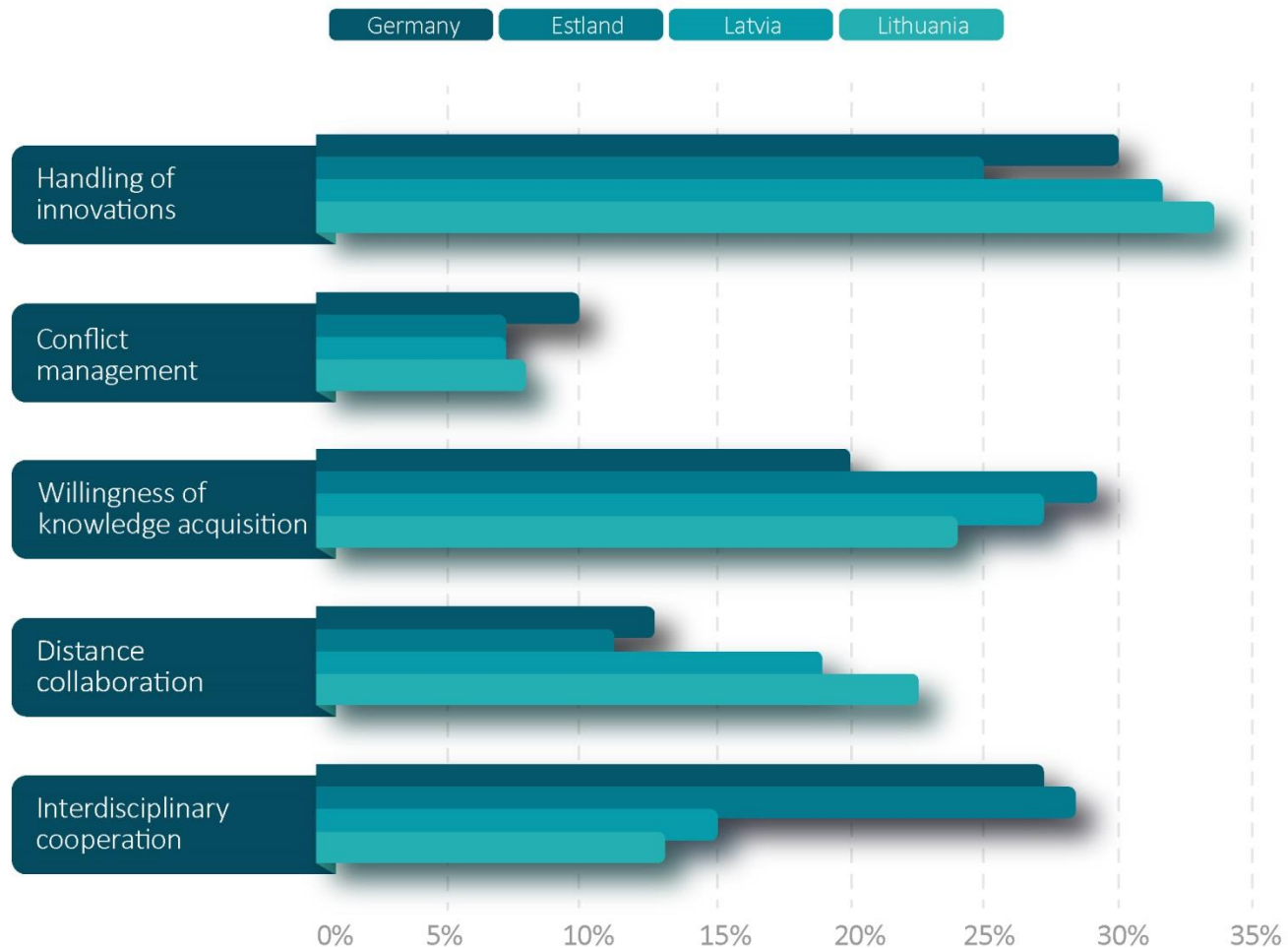
Which competencies should be developed already in the initial vocational training to simplify the implementation of industry 4.0?



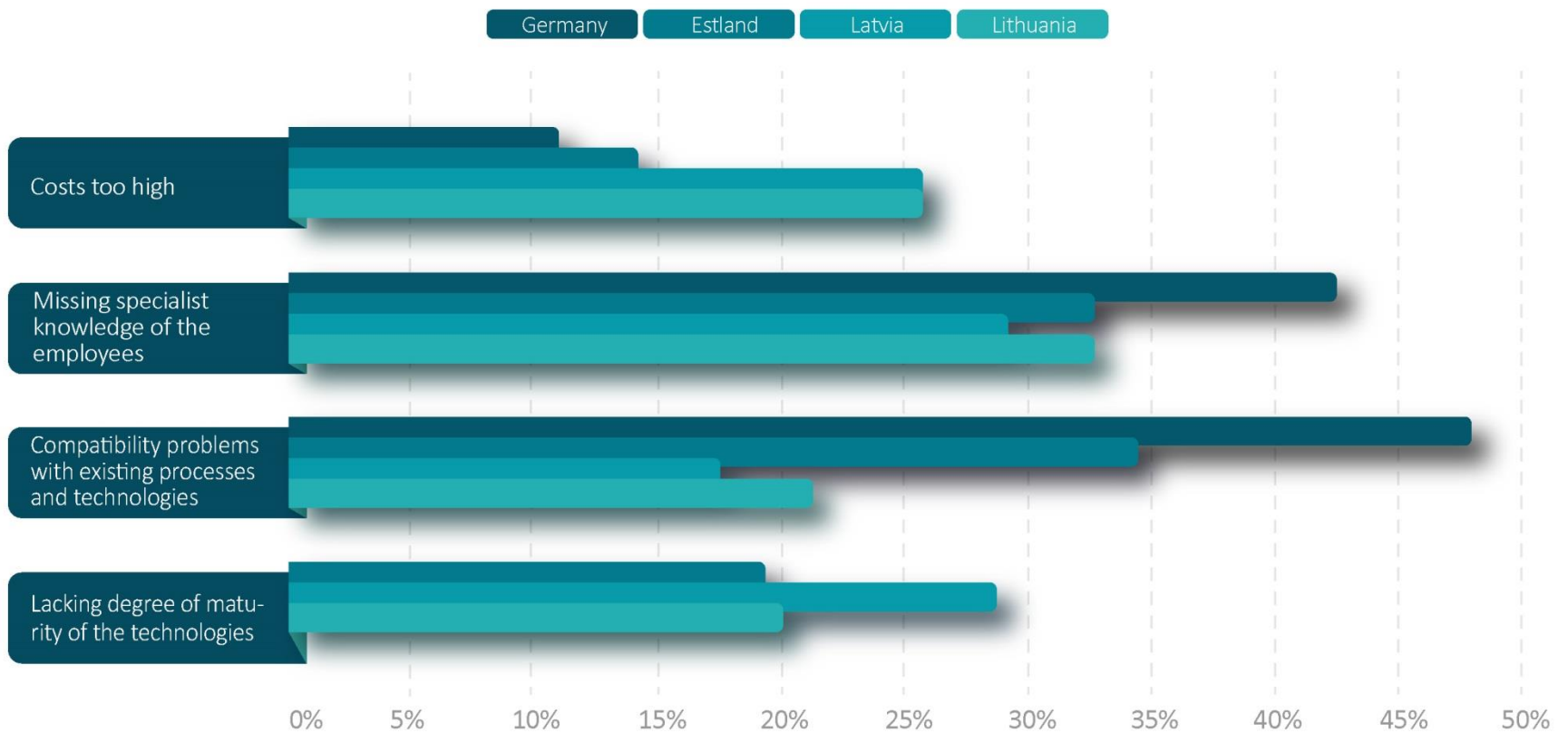
Which competencies will be important for the professionals in your enterprise in the future for implementation of industry 4.0?



Which soft skills do you hold for especially relevant for the implementation of industry 4.0 for trainees as well as for professionals?



What is in your point of view the main challenge for implementation of industry 4.0?



Which qualification and competence standards are expected in your opinion to the professionals in your enterprise in the future for implementation of industry 4.0?



Comparative Analysis of Qualification Standards

The analysis focused on investigation of current VET qualification standards in Germany, Lithuania, Latvia and Estonia and established:

- Comparison and analysis of occupation profile
- Best practice examples
- A summary list of competences
- Criteria and recommendations for developing a model QS and a model VET programme.

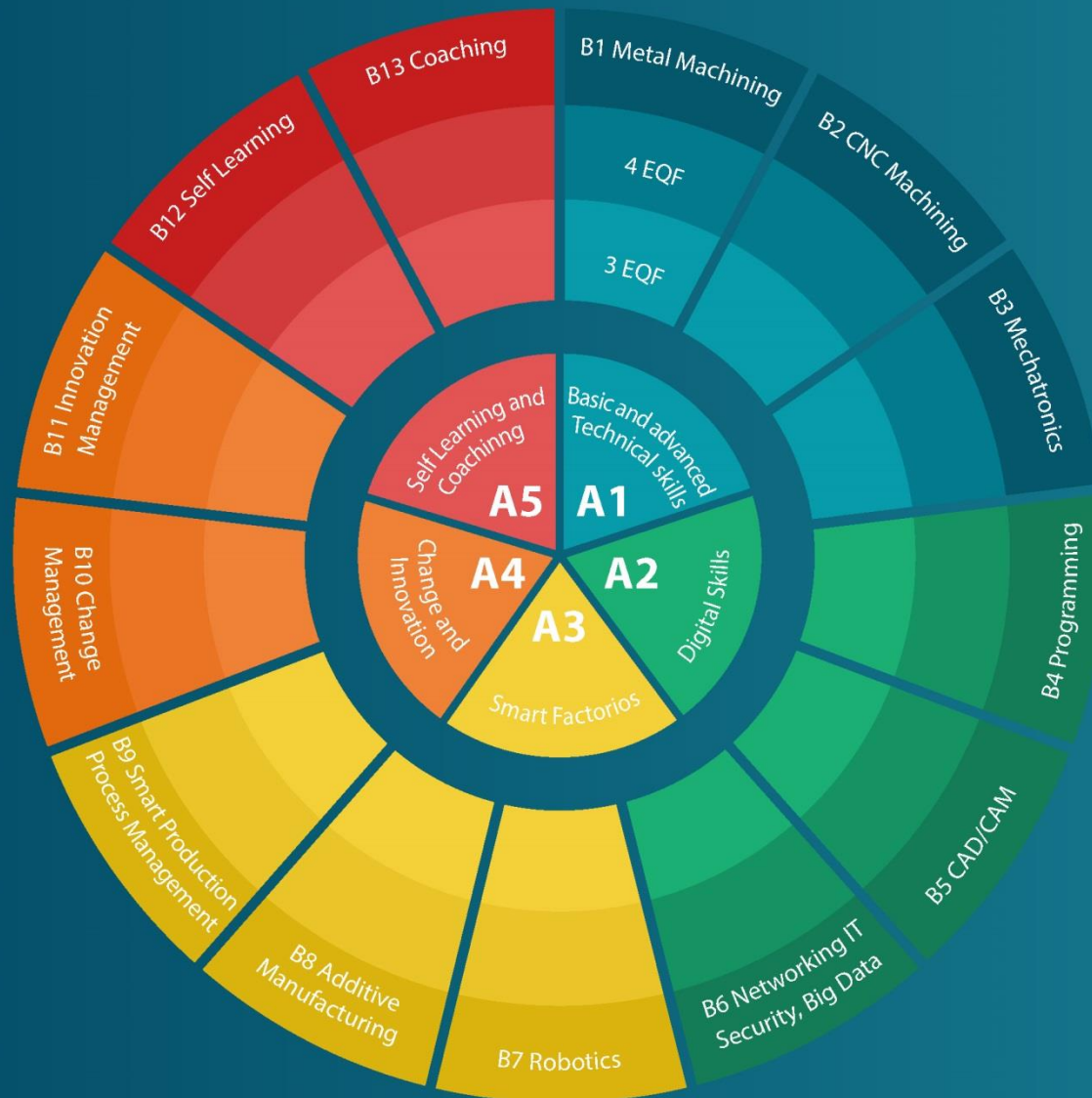


Drawing up a Model Qualification Standard and a Model VET Programme

Developed Galaxy model qualification standard and VET curriculum for metalworkers' professional profile that is adapted to the industry environment and aligned according to the requirements of legal framework of each country



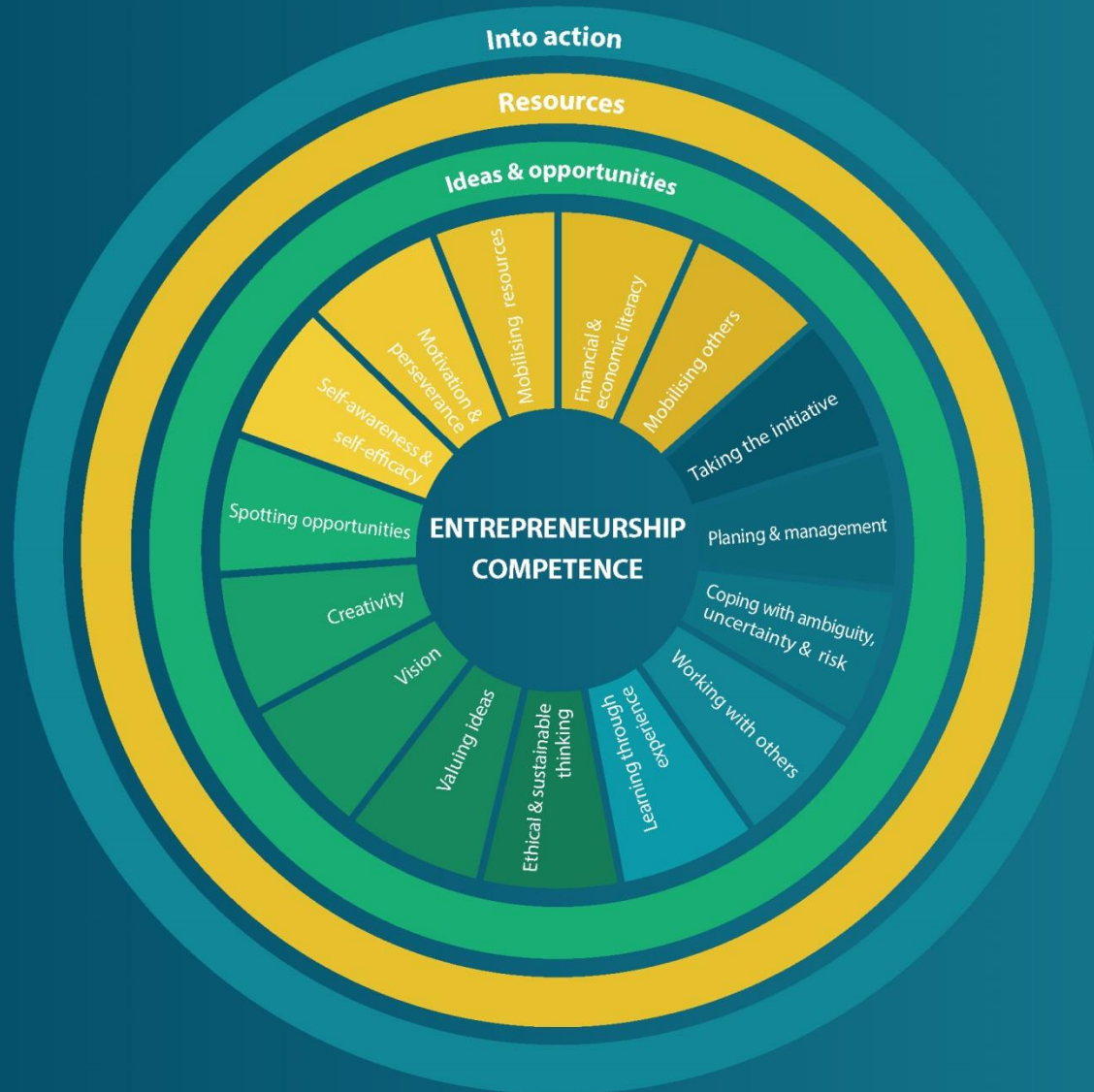
Galaxy model of core sets of competencies



Core sets of competences of Galaxy model

A1	Basic and advanced technical skills	B1 Metal Machining (3-5 EQF) B2 CNC Machining (3-5 EQF) B3 Mechatronics (3-5 EQF)
A2	Digital skills	B4 Programming (3-5 EQF) B5 CAD / CAM (3-5 EQF) B6 Networking, IT security, Big data (3-5 EQF)
A3	Smart factories	B7 Robotics (3-5 EQF) B8 Additive manufacturing (3-5 EQF) B9 Smart production process management (3-5 EQF)
A4	Change and innovation	B10 Change management (3-4 EQF) B11 Innovation management (3-4 EQF)
A5	Self learning and coaching	B12 Self learning (3-4 EQF) B13 Coaching (3-4 EQF)

Project Include ENTREPRENEURIAL SKILLS DEVELOPMENT



Training Material for Trainers in the VET institutions and in-company trainers

Trainers Manual next to basic and specialized technology content, also includes innovative coaching techniques for metalworkers

Set of **Verification tests** (both theoretical and practical) and Educational posters will be used for the provision of training

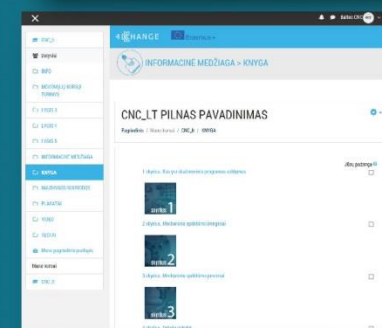
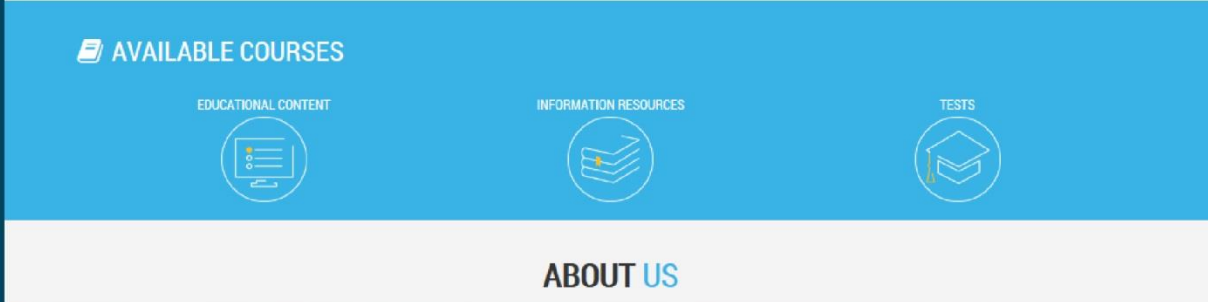


Training Material for Learners

Textbook provide the latest approach to machine tool technology, modern integrated manufacturing, CNC systems, smart manufacturing in Factories of the future and entrepreneurship

and **Workbook** include exercises based on industrial practice and sample solutions





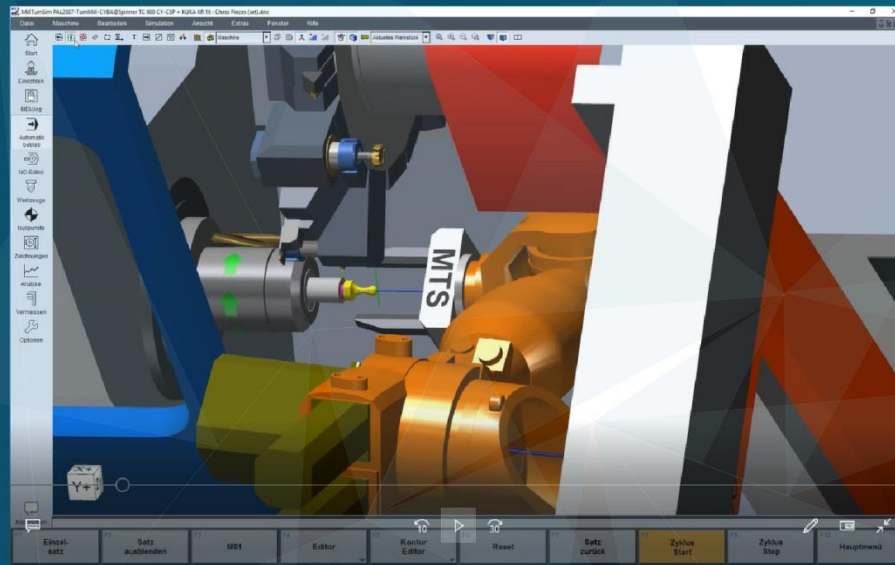
Development of E-Learning Platform

The E-learning platform will act as an on-line training tool for learners, trainers, VET institutions, manufacturing enterprises and individuals aiming at acquiring metalworkers profession

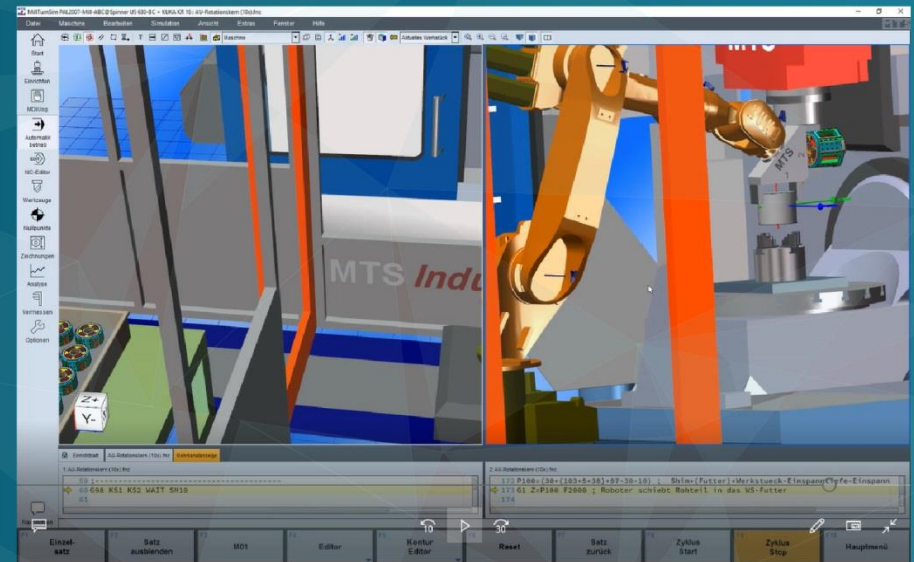
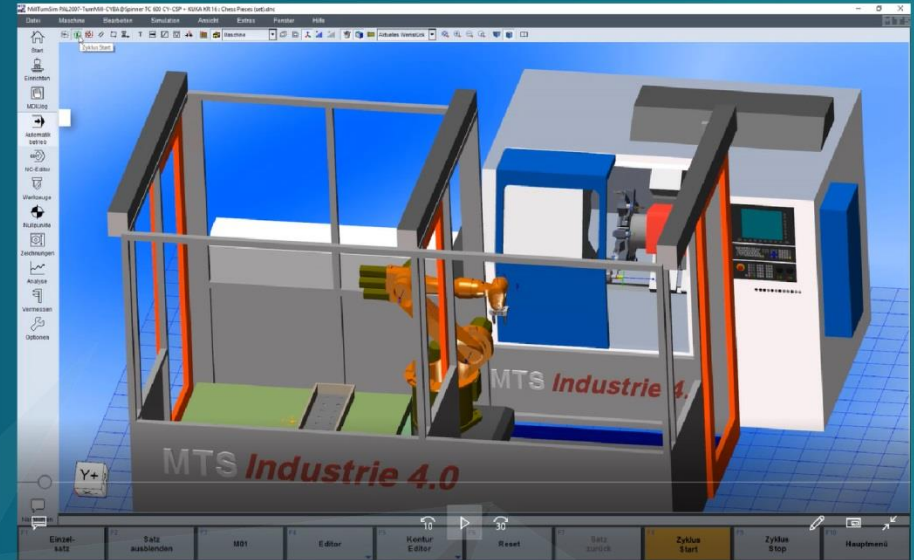
It is established as an Open Education Resource system with a focus on accessibility and easy sharing



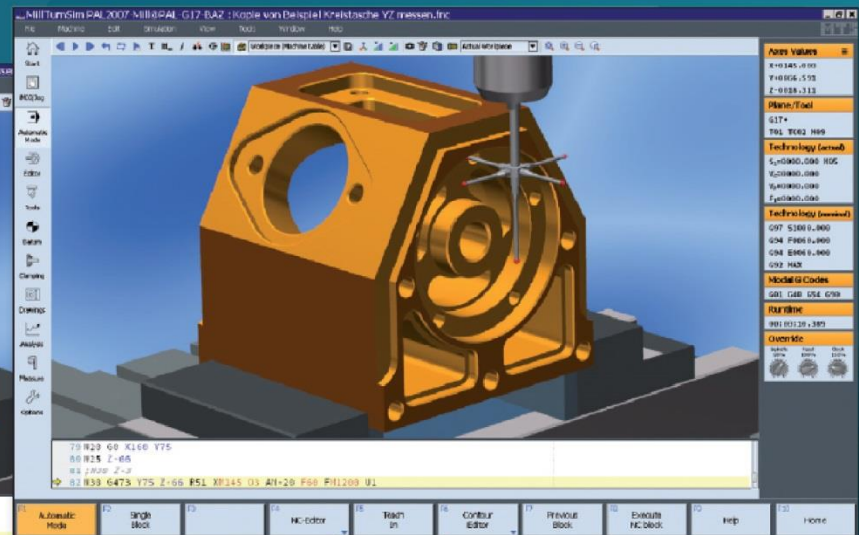
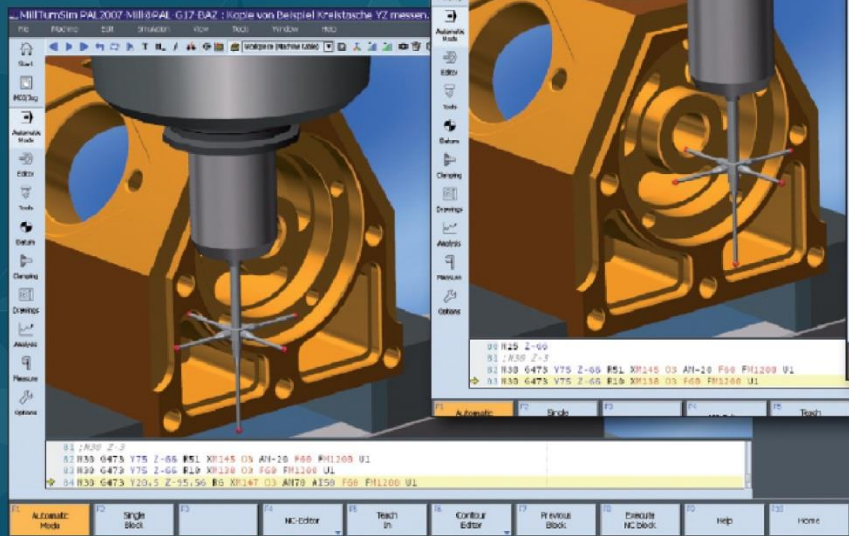
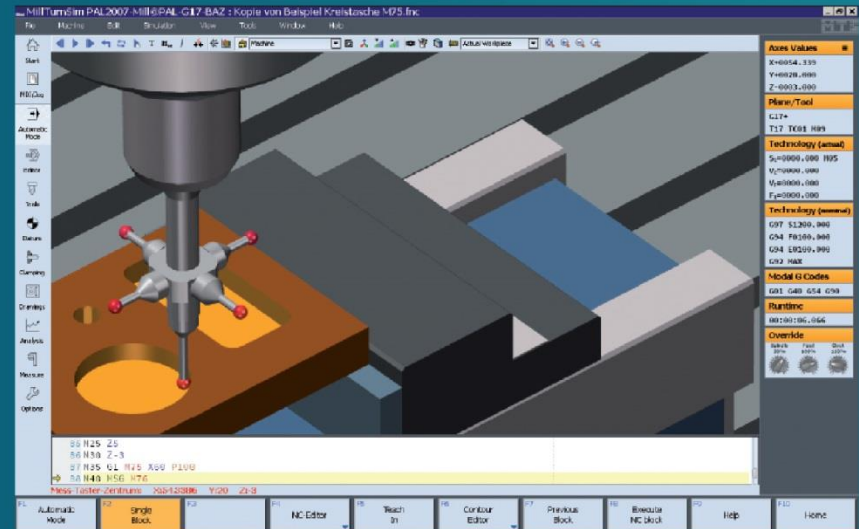
Robot and CNC machine in action



Robotized MTS-CNC manufacturing cell for Industrie 4.0



Direct measuring operation
of the workpiece during
machining process,
integrated into MTS-CNC
milling simulation software



Piloting

Trainers from VET institutions and master metalworkers from manufacturing enterprises (in-company trainers)

Learners from VET institutions and metalworkers from manufacturing enterprises



Thank You for attention

Learning platform
<https://cnc4change.org/>

Project web page address
<http://www.change4industry.eu/>



Access for everybody
will be open from
December 2018