Qualifications & Curricula Research Report

Deliverable D1 (WP1)

WP1 Qualifications & Curricula Research

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EXECUTIVE SUMMARY

The ability of companies and individuals to adapt to future competence needs, as well as the education and training systems' ability to provide services that match labour market needs is central to European plastic converters' global competitiveness and individual employability. VET providers need to be able to deliver adequate skills, knowledge and competence development measures. VET providers are constantly updating existing training programs and creating new ones based on the needs of the industry. UPSKILL will contribute to the preparation of European plastics specialists - plastics machine operators. Project partners, taking into account the needs of Lithuanian, Belgian, Finnish and French companies, as well as wider European needs, will provide an innovative VET programme which will be developed within the framework of the project and will include training modules on green and digital skills. The Qualifications & Curricula Research is of great significance not only to VET providers but also to national accreditation and qualification bodies, plastics industry and government representatives. This Output will be applied for developing an innovative approach to plastics machine operators' occupation, professional standards and VET programmes.

The objective of the report is to conduct the Qualifications & Curriculum Research which will act as a tool for project partners to create model and country-specific VET curriculum. Following the research, the report (is drawn to) makes recommendations for developing the model VET programme EQF4. The research is based on qualifications that are provided by VET institutions in partner countries and correspond to EQF Levels 2, 3, 4 and 5. The research analyses titles of occupations, defines occupational activities, provides competency requirements for occupational qualifications, VET standards and/or curricula from partner countries.

Qualifications & Curriculum Research gives information about plastic processing sector in Europe, analysis of vocational training legislations, overview of qualifications framework, comparison and analysis of occupation profile and existing curriculum for plastic processing, survey of business companies in Lithuania, Finland, France, Belgium.

The "Qualifications & Curricula Research" Report is one of the results of the Erasmus+ program Key Activity 2: Cooperation for innovation and the exchange of good practices – Sector Skills Alliances project „Actions Upward: The Skills for the Digital Future of Plastics Factories" No 600641-EPP-1-2018-1-LT-EPPKA2-SSA. The project is coordinated by Engineering Industries Association of Lithuania (LINPRA).

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OVERVIEW OF THE DELIVERABLE

WP:	1
Task:	A tool for project partners to design model and country-specific VET curriculum
Title:	Qualifications & Curricula Research Report

- The **objective** of the report is to make the Qualifications & Curriculum Research which will act as a tool for project partners to create a model and country-specific VET curriculum. Following the research, the report will be drawn up to make recommendations for developing the model VET programme. The Research will be based on qualifications that are provided by VET institutions in partner countries and correspond to EQF Levels 2, 3, 4 and 5. The Research will analyse titles of occupations, define occupational activities, and provide competency requirements for occupational qualifications, VET standards and / or curricula from partner countries. The Research will be of great significance not only to VET providers but also to national accreditation and qualification bodies, plastics industry and government representatives. This Output will be applied to developing an innovative approach to plastics machine operators' occupation, professional standards and VET programmes.

- KPMPC will lead this WP as it has enormous experience in applied research in educational fields of excellence. The partner will provide research methodology, procedures and tools. Data provided by other partners will be analysed and summarised in the Research Report. All the partners will disseminate the Report to the beneficiaries in their countries. All partners will contribute to the preparation of the research and the report.

LIST OF ABBREVIATIONS AND ACRONYMS

SME – Small and Medium Enterprise
WP – Work package
HLG - High-Level Group
UAS - Universities of Applied Sciences
PPPs - Public-Private Partnerships
BEFL - Flemish community
BEFR - French community
BEDG - German-speaking community
BTS - Brevet de Technicien Supérieur
RNCP - National Register of vocational certifications
VET – Vocational education and training which aims to equip people with knowledge, know-how, skills and/or competences required in particular occupations or more broadly on the labour market. Source: adapted from European Training Foundation, 1997.
EQF - Reference tool for describing and comparing qualification levels in qualifications systems developed at national, international or sectoral levels. *Comment*: the EQF's main components are a set of eight reference levels described in terms of learning outcomes (a combination of knowledge, skills and/or competences) and mechanisms and principles for voluntary cooperation. The eight levels cover the entire span of qualifications from those recognising basic knowledge, skills and competences, to those awarded at the highest level of academic, professional and vocational education and training. EQF is a translation device for qualification systems. Source: based on European Parliament and Council of the European Union, 2008.
QS – Qualification standards are considered to be norms and specifications applying to the following aspects of qualifications: (a) Occupation standards may specify 'the main jobs that people do', describing the professional tasks and activities as well as the competences typical of an occupation. Occupational standards answer the question 'What does the student need to be able to do in employment?'; (b) Education standards may define the expected outcomes of the learning process, leading to the award of a qualification, the study programme in terms of content, learning objectives and timetable, as well as teaching methods and learning settings, such as in-company or school-based learning. Educational standards answer the question 'What does the student need to learn to be effective in employment?' (c) Assessment standards may specify the object of assessment, performance criteria, assessment methods, and the composition of the jury entitled to award the qualification. Assessment standards answer the question 'How will we know what the student has learned and is able to do in employment?' Source: CEDEFOP, 2009.
IVET – Initial vocational and education training. General or vocational education and training carried out in the initial education system, usually before entering working life. Comments: 1. some training undertaken after entry into working life may be considered as initial training (such as retraining); 2. initial education and training can be carried out at any level in general or vocational education (full-time school-based or alternance training) or apprenticeship pathways. Source: Cedefop, 2008.
ECVET - The European Credit System for Vocational Education and Training. It is a

technical framework which supports the transfer, recognition and accumulation of learning outcomes. ECVET provides a set of principles and tools that facilitate the process of learner recognition, with a view to achieving a qualification. Source: Erasmus plus, UK National agency.

1 OVERVIEW OF PLASTIC PROCESSING SECTOR

The plastics industry today is a strategic pillar of the manufacturing sector in Europe – one whose competitiveness has a significant knock-on effect on other key areas of the economy. It is an inherently innovative industry in its own right, as well as an enabler of innovation across different sectors.

The European plastics industry is facing a critical challenge – the lack of skilled workforce. Due to skill gaps, companies in the plastics industry across Europe face various problems: unfilled vacancies, downtime, production defects, longer delivery times, negative impact on the competitiveness.

There will be significant number of job openings in the plastics manufacturing sector. It is important to consider that the nature of these jobs and their skill requirements will change.

An increasing number of jobs require complex skills, hence low-qualified people have fewer employment opportunities available to them. Projected sectoral changes will have significant implications for the occupational skills needed in the future.

Apart from technical know-how, a whole range of skills are critical:

- Digital and programming skills as emerging business models that disrupt traditional markets;
- Green skills needed to seize the opportunities of low-carbon technologies;
- Entrepreneurial competencies that will facilitate the competitiveness of a highly motivated workforce;
- Skills for robotics due to technology-driven innovation;
- Appropriate technological competencies to apply smart technology.

1.1 EUROPE-WIDE INDUSTRY NEEDS

New technologies and digitalization are changing the industry on a global scale. In order to remain competitive, Europe needs to invest more in its workforce by increasing its talent pool and creating conditions for people to acquire updated skills. Innovation comes from the creativity and skills of individuals. There is a global race for talent and the European workforce needs to acquire high-level skills and continuously improve them to boost employability and fuel competitiveness and growth[1].

By 2025, Europe could see its manufacturing industry add gross value worth 1.25 trillion euros, or suffer the loss of 605 billion euros in foregone value added. Europe's companies have a very good chance of benefiting from the digital transformation, but companies must put a series of conditions in place and up the time of change[2]. Moreover, decision and policymakers across Europe need to create a regulatory framework that allows Europe's diversity and its industrial capabilities to be translated into competitive advantages.

The European Commission identified a lack of skills as a bottleneck in transforming manufacturing. There are increasing skills gaps and mismatches related to digital and high-tech key enabling technologies. Companies across Europe are reporting difficulties in finding employees not only with high-level skills but with skills fit for the current markets. Skills needs must be better anticipated to

[1] https://ec.europa.eu/growth/industry/policy/skills_en
[2] https://digitalindustryalliance.eu/2018/07/05/industry-4-0-trends-needs/

manage change, nurture new types of work and strengthen social cohesion. The goal of the European Commission is to increase the EU talent pool and foster the acquisition of new skills with a focus on new technologies. Identified priorities are high-tech skills and related leadership capabilities. These two priorities are seen as crucial for European large industries and small and medium enterprises (SMEs).

The European Commission is concentrating its efforts on: benchmarking policies; monitoring trends and the supply and demand; scaling up best practices; better focusing on funding programmes and incentives; promoting greater professionalism; curriculum guidelines; specialized skills (including big data, the Internet of Things and cyber-security); multi-stakeholder partnerships and synergies.

1.1.1. Key Enabling Technologies

Key Enabling Technologies (KETs) provide the basis for innovation in a range of products across all industrial sectors. They highlight the shift to a greener economy, are instrumental in modernizing Europe's industrial base, and drive the development of entirely new industries[3].

KETs are a group of six technologies: micro and nanoelectronics; nanotechnology; industrial biotechnology; advanced materials; photonics; advanced manufacturing technologies.

1.1.1.1 The European Strategy for KETs [4]

The strategy aims to increase the exploitation of KETs and to reverse the decline in manufacturing with an idea to stimulate growth and jobs. The European Commission has identified KETs as a key priority within its Europe 2020 strategy. KETs are seen as essential to flagship initiatives such as Innovation Union[5] and Digital Single Market[6]. Furthermore, KETs are highlighted in various other strategic documents, such as "*For a European Industrial Renaissance*"[7] and "*A Stronger European Industry for Growth and Economic Recovery*"[8].

This European approach on KETs has strong support from EU countries, regions, industry, and others involved in industrial innovation. The strategy is a combined effort of different Directorate-Generals of the European Commission (DG), including DG Research and Innovation, DG Communications Networks, Content and Technology, DG Regional Policy, DG Trade, and DG Competition, under the political leadership of DG Internal Market, Industry, Entrepreneurship and SMEs.

In addition, several groups have been set up to ensure the successful implementation of the KETs strategy:

- High-Level Group (HLG) consists of representatives from research and industry associations. This group is advising on the implementation of the KETs action plan;
- Member States Group on KETs has been set up to improve collaboration between European and national/regional level actors;
- Commission Internal coordination groups (the KETs Interservice Group and the Leadership in Enabling and Industrial Technologies Group of Horizon 2020) ensure coherence between all KETs-related programmes.

[3] https://ec.europa.eu/growth/industry/policy/key-enabling-technologies_en
[4] https://ec.europa.eu/growth/industry/policy/key-enabling-technologies/european-strategy_en
[5] https://ec.europa.eu/info/research-and-innovation/strategy/goals-research-and-innovation-policy/innovation-union_en
[6] https://ec.europa.eu/digital-single-market/
[7] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52014DC0014
[8] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52012DC0582

1.1.2. Digital Transformation

According to the McKinsey Global Institute's Industry Digitization Index, Europe operates at only an estimated 12% of its digital potential, compared with the United States' 18%. In addition, there is enormous variation between Europe's countries: while France operates at 12% of its digital potential, Germany is at 10%, and the United Kingdom is at 17%.[9]

Europe's low overall level of digital intensity[10] reflects huge gaps between leaders and stragglers. The continent's economy is digitizing unevenly, with large variations among sectors and firms: while the ICT sector is at the digital frontier, closely followed by the media and finance, large traditional sectors are far behind.

Currently, European businesses are not taking full advantage of many advanced technologies or the innovative business models offered. The state of the digitisation of industry varies across sectors, particularly between high-tech and more traditional areas, and also between Member states and regions. Moreover, there are also huge disparities between large companies and SMEs.

The European Commission sees a digital transformation of EU business and society as an opportunity for growth potential for Europe. European industry can build on its strengths in advanced digital technologies and its strong presence in traditional sectors to seize the range of opportunities that technologies such as the Internet of Things, big data, advanced manufacturing, robotics, 3D printing, block chain technologies and artificial intelligence offer[11]. This will enable the industry to capture a share in the emerging markets for the products and services of the future.

The digital transformation is characterised by a fusion of advanced technologies and the integration of physical and digital systems, the predominance of innovative business models and new processes, and the creation of smart products and services.

The European Commission identified four policy areas that need to be given a priority when tackling digital transformation:

- Big data and digital platforms have grown dramatically over the past decade and are radically transforming every industry. The large volumes of data generated from equipment, machines and people provide significant opportunities for innovation, new business models and smart products and services;
- Digital Skills are a major priority for Europe. The demand from EU industry and enterprises for new types of skills highlights the need to reskill and reemploy the redundant workforce. The widening digital skills gap will have an impact on the ability of EU businesses and governments to benefit from the opportunities of digitalisation;
- Cities and regions are major enablers of digital transformation in Europe. They orchestrate the development of vibrant innovation ecosystems by bringing together local resources and mobilising the participation of stakeholders;
- ICT standardisation and interoperability are a precondition for the uptake of digital innovations. The challenge is to develop and ensure the adoption of European standards

[9] https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/digital-europe-realizing-the-continents-potential

[10] Degree to which digitization drives sectors and firms

[11] https://ec.europa.eu/growth/industry/policy/digital-transformation_en

that ensure compatibility between systems and guarantee the competitiveness of European industry and the openness of ICT markets.

1.1.3. Digital Single Market

In 2016, the European Commission launched the first industry-related initiative of the Digital Single Market initiative. The initiative is complementary with various national programs for digitising industry (Industrie 4.0, Smart Industry and l'industrie du futur). The Digital Single Market includes the use of policy instruments, financial support, coordination, and legislative powers to trigger further public and private investments in all industrial sectors and create the framework conditions for the digital industrial revolution. The Digital Single Market is based on 5 pillars:

- *European platform of national initiatives on digitising industry*. The goal is to build a critical mass of initiatives and investments for digitising industry and to ensure the commitment of the Member States, regions and the private sector.
- *Digital innovations for all: Digital Innovation Hubs*. Digital Innovation Hubs are foreseen as places for companies (SMEs, startups, and mid-caps) to get guidance to improve their business, production processes, products and services.
- *Strengthening leadership through partnerships and industrial platforms*. Support the development of digital industrial platforms and large-scale piloting and Public-Private Partnerships (PPPs) that provide the digital technology building blocks of the future.
- *A regulatory framework fit for the digital age*. The European Commission has already proposed several measures to update regulations in key fields for industry such as cybersecurity and a free flow of data.
- *Preparing Europeans for the digital future*. To make the most of the digital transformation we must ensure that all Europeans are ready for these changes. Adapting the workforce and the education and learning systems, together with major investments in reskilling citizens are needed.

1.1.4. Digital Skills & Jobs

Labour productivity has fallen in all developed countries in recent decades. Both weak investment activity and deficits in innovation and structural policy are responsible for this[12]. The countries with high research and development rate are doing better on average, but only a few firms on the technological front exhibit very high productivity growth.

The spread of digital technology has an impact on the European labour market and the type of skills needed in the economy and society. The digital technology is changing the structure of employment, leading to the automation of "routine" tasks and to the creation of new and different types of jobs or fundamentally changing the existing jobs. Moreover, it is leading to the need for more skilled ICT professionals in all sectors of the economy and is creating a need for digital skills for nearly all jobs where ICT complements existing tasks. Different careers require increasing levels of digital skills. In addition, the digital technology has changed traditional learning paths by fostering online communities, by enabling personalised learning experiences, by supporting the development of soft skills such as problem-solving, collaboration and creativity.

[12] https://english.bdi.eu/topics/europe/european-industrial-and-economic-policy-internal-market/#/article/news/poor-productivity-growth-places-future-prosperity-under-pressure/

The new Skills Agenda for Europe, adopted by the Commission on 10 June 2016, launched **10 actions**[13]:

- Upskilling Pathways: New Opportunities for Adults
- European Qualifications Framework
- Digital Skills and Jobs Coalition
- Blueprint for Sectoral Cooperation on Skills
- EU Skills Profile Tool Kit for Third-Country Nationals
- Vocational education and training (VET)
- Key competences
- Europass
- Graduate Tracking
- Analysing and sharing of best practice on brain flows

1.1.1.2 VET

The Commission is continuing to work on a set of measures to support the modernisation of VET, in line with the policy priorities defined in the 2015 Riga Conclusions. The Riga conclusions call for developing a strong partnership with complementary partners and other relevant stakeholders, promoting excellence and innovation in VET and using the learning outcomes approach. Furthermore, they encourage the promotion of work-based learning integrated into the school-based programme, strengthening key competencies, enhancing access to quality vocational training by designing an innovative VET programme, etc.

A review of the Recommendation on Key Competences for Lifelong Learning[14] was undertaken to help more people acquire the core set of skills. The review focused on promoting entrepreneurial and innovation-oriented mind-sets and skills. Moreover, in April 2018, EU countries adopted the Commission's proposal to revise the Europass[15] framework. It is designed to ensure that the Europass framework can offer people better and easier-to-use tools to present their skills and obtain useful real-time information on skills needs and trends which can help with career and learning choices.

1.1.5. Conclusion

The European Commission identified new curriculum guidelines as one of the solutions for increasing the EU talent pool and fostering the acquisition of new skills. Moreover, it is highlighting the shift to a greener economy through identified key enabling technologies, and advanced manufacturing technologies are considered as one of KETs.

1.2 LITHUANIA

The Lithuanian engineering industry is the country's largest processing production sector, generating 4 % of Lithuania's total value-added. The industry consists of over 1500 companies, employing 39700

[13] https://ec.europa.eu/social/main.jsp?catId=1223&langId=en
[14] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32006H0962
[15] https://europass.cedefop.europa.eu/

specialists. Furthermore, 408 of Lithuanian engineering industry companies operate in the plastics industry, employing about 1000 people.

The Lithuanian plastic industry is still young, but it is considered to have high production potential in Europe. This industry is expanding rapidly across the continent – with an average of 5 % annually.

Plastic products are already displacing traditional materials. The use of plastics is growing rapidly in the machinery and construction industry. Until 1970, 88% of any automobile was made out of metal and remaining parts were made out of rubber and glass. Nowadays, automobile is made from metal (55%), plastic materials (25-30%), and even the glass parts are replaced by polymer ones. Making cars become much lighter and more economical.

The Lithuanian plastics industry is lacking machine operator specialists, as well as manufacturing process engineer specialists.

1.2.1. Education for the plastics industry

There is only one education institution in Lithuania which provides a study programme related to the plastics industry – Kaunas University of Technology, with the study programme - *Production Engineering*. The programme is focused on enabling graduates to carry out and lead production processes in companies that operate in a fast-changing market environment. To work efficiently a specialist must have knowledge of production technologies and process management, be able to develop and manage production processes, choose materials for products, understand technological equipment and ensure its operation, and analyse technical production problems. Study programme provides special technical knowledge on engineering materials technologies in 3 different specializations: wood, metal and plastics. The plastics specialization consists of 3 modules:

- *Plastics technologies methods*:
  - Aim of the module: to provide the ability to select compositions, forming, assembling and finishing techniques for the production of plastic products, taking into account material properties, product design, performance requirements, aesthetic appearance and price.
  - Abstract of the module: impact of plastics on public welfare, environmental protection and human safety. The process of creating products from plastics and composites by analysing the methods of forming, joining and finishing products.
- *Plastics and testing methods*:
  - Aim of the module - to gain knowledge about the range and properties of the most widely used plastics and to provide the ability to determine their physical, mechanical, thermal and chemical properties by laboratory methods.
  - Abstract of the module - knowledge about the composition and properties of the most widely used plastics, advantages and disadvantages, principles of plastic selection for the product. Introduction to physical, mechanical, thermal, electrical, chemical and optical properties of these materials, their detection devices and methods.
- *Design of polymer products equipment:*
  - Aim of the module - to understand the behaviour of the formed polymer products depending on the constructional parameters of the equipment and technological modes of forming the equipment; to provide knowledge about the equipment of polymer product formation - design and operation principles, forming technological regimes,

principles of design of the working surfaces of equipment, to develop abilities to design working surfaces of polymer product forming equipment.

- Abstract of the module - developing abilities to understand the behaviour of polymeric products, depending on the properties of the materials, the technological regimes of forming and the design parameters of the equipment. Training in equipment classification for polymer product formation, to analyse its structure and operation principles. The principles of designing the working surfaces of equipment for the forming, pressing, vulcanization and casting of polymeric materials, parts, assemblies and articles are mastered.

1.2.2. Lithuanian Plastics Cluster

The Lithuanian plastics cluster currently includes 14 Lithuanian companies and is coordinated by LINPRA. The cluster has developed a clear mission, to facilitate informal networking among partners, increase competitiveness, the return on investment as well as inspire and support partners in their leadership in innovation and market outreach. The Cluster is a reliable network of the plastics industry enterprises – developers and producers of high added value, innovative and competitive technological products.

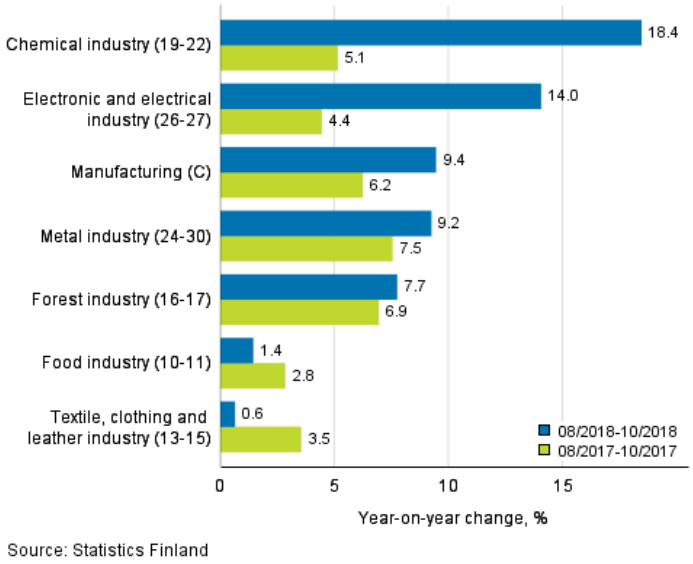
Currently, the cluster includes 14 Lithuanian companies, corresponding to more than 20% of the Lithuanian plastics industry, exporting to 2/3 of European countries and employing more than 1200 employees.

Lithuanian Plastics Cluster activities cover: injection moulding, extrusion, blowing, design, tooling, prototyping, thermoforming, subcontracting, education.[16]

1.3 FINLAND

In 2017, the value of industrial output in Finland was €86.5 billion. The figure below illustrates the structure of the industry in more details, where the plastics industry is included as part of the chemical industry

[16] https://plasticscluster.com/



Source: Statistics Finland

In 2018, there were 34000 employees in the chemical industry, and over 50% had the educational background in the field of technology or natural sciences. According to XYZ, 43 % of the recruitment in the industry focuses on people who have a vocational degree, 27 % on people who have a degree from a university of applied sciences and 30 % on people who have a university degree. The employees in the manufacture of plastic and rubber products in 2017 were about 12000. In Finland there are about 600 companies in the field of plastic industry. Most of them are plastic converters and the typical company size is small to medium.

1.3.1. Education for the plastics and rubber industry

Finland has 13 universities and 23 universities of applied sciences (UAS). It is possible to reach Master-level education in the fields of Material Science and/or Engineering in university or in UAS. In universities it is possible to focus on either science (researcher career) or engineering (industrial career). Also in UASs it is possible to continue after Bachelor-level and reach Master's degree with a more practical twist compared with traditional university studies.

Plastics and rubber technology can be studied in a few UAS. At university level, Polymer Technology or Polymer Chemistry are part of the syllabus in Aalto University and in Helsinki University. Higher education in plastics and rubber production technology is offered at Aalto University and Tampere University of technology.

Students who complete the upper secondary school syllabus can take the national Matriculation Examination. Upon successful completion of the Matriculation Examination and the entire upper secondary school syllabus, students are awarded a separate certificate that shows details of the tests passed and the levels and grades achieved. Passing the Matriculation Examination entitles the candidate to continue their studies at a higher education level (either at a university or a university of applied sciences). Students in vocational upper secondary education and training may also include studies giving them a possibility to take the matriculation examination in those studies. This extends their VET studies by one year.

Vocational studies in Finland can either lead to a professional qualification or be in the form of continuing education needed in different career stages. i.e. VET in Finland is designed both for young people without upper secondary qualifications and for adults already in employment. The legislation (2018) on VET reinforces professional skills in Finland. The most important task of VET is

to produce individual skills that meet both the needs of students and working life. Vocational qualifications can be completed in school-based VET or as competence-based qualifications. VET is organised mainly in institutions (on-the-job learning included) or as apprenticeship training. A vocational qualification gives general eligibility for university of applied science and after that university studies. The Ministry of Education and Culture is responsible of VET legislation and steers and supervises the sector. The Ministry also grants the education providers' permits to provide VET.

VET is developed, delivered and assessed in close cooperation with the industrial companies in the field. Students' performance will be assessed together by teachers and experts in working life. Increasing the opportunities for working life-oriented studies aims to respond to the changes in working life. The funding model encourages education providers to adopt measures to reduce discontinuation of studies and recognise previously acquired skills more efficiently. Vocational special needs education is designed for students who need special support in learning and studying regularly or on a long-term basis due to learning difficulties, disabilities, illness or other reasons. A short pre-vocational preparatory education for immigrants is also possible. Vocational education and training is offered in eight (8) different fields: Agriculture and Forestry; Business, Administration and Law; Education; Health and Welfare; Humanities and Arts; Information and Communication Technologies; Natural Sciences; Service Industries; Social Sciences; Technology.

VET education possibilities and needs vary in Finland in all branches depending on the geographical and local needs. All qualifications are now wider than before 2018 and there may be changes in specific provision according the individual VET providers' strategy. In the plastics and rubber industry a mixture of economic, engineering, chemistry etc. knowledge is needed. Often the VET for Plastics and Rubber processing skills are in the Technology field called Machine and Production Technology and/or Process Technology. Some institutes for VET education: AEL, Helsinki; KPEDU, Kokkola; Riveria, Joensuu; Salpaus Further Education, Lahti; SAKKY, Juankoski and Kuopio; VAAO, Valkeakoski; Tampere Vocational College Tredu, Tampere.

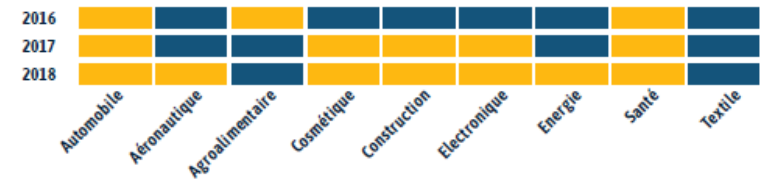
1.4 FRANCE

The plastics industry is a major industrial sector in France, whose economic context has been positive for the last few years.

- The medium turnover of the plastics industry growth between 2009 and 2018 was +2.2%;
- The Registered medium production growth between 2014 and 2016 rose by +2.9%;
- The Plastics Industry's GDP in France represents almost 4% of the whole industry's GDP:

France's plastics industry is mainly composed of SMEs, as the average size of companies is 36 employees, and the average turnover in 2018 was €8.5 million.

Recent developments for plastics companies have been very different according to each market:



Source: Fédération de la Plasturgie et des Composites

1.4.1. Education

1.4.1.1 Initial training

The educational system in France is designed to offer a wide-range curriculum for students who aim for an occupation in the Plastic Industry. In 2017, 2 050 students were registered in the different diplomas in France's public educational system (CAP, Bac Pro, BTS), showing a slight increase by 1% compared to 2016 figures.

French companies often express the fact that trained students generally fit their skills needs and praise the quality of initial training.

However, despite this complete offer in initial training, the number of students trained in the plastics industry remains largely insufficient to fit the recruitment needs of companies. Plastics training programs attracts too few students. Several factors cause this low attractiveness for the General Public:

- A degraded image of the industry, still often related to poor working conditions;
- A degraded image of plastic materials themselves (impact on the environment, 7th 'continent of plastics', etc.);
- A misreading about plastics industry occupations / jobs;
- A lack of communication about attractive aspects of plastic-industry jobs such as a very high employment rate, career perspectives, daily use of up-to-date technologies, innovation, etc.

1.5 BELGIUM

1.5.1. The Plastics Processing Sector in Belgium

Belgium is the European powerhouse of the plastics and rubber industry. The turnover in the first six months of 2018 was €4.5 billion, which represents a 10.3% increase compared to the first six months in 2017. The turnover for the entire 2017 was €8.1 billion, and €7.8 billion in 2016.

Investments in the sector have increased approximately 20% every year for the last three years. In the first six months of 2018 investments reached almost €200 million. The investments in 2017 (in all 4 quarters) were €375 million and in 2016, they were €307 million. In 2018, the major investments came from Inovyn, Nippon Shokubai and Borealis.

The Plastics industry is a major employer in Belgium. According to the latest data, in the first six months of 2018 there were 21496 employees in the industry. The situation is similar for 2016 and 2017, there were 21288 and 21322 people employed in the sector, respectively.

There are several reasons that make Belgium attractive for the plastic industry.

- Availability of raw materials:

- a presence of major seaports (Antwerp, Zeebrugge, Ghent);
- a dense network of pipelines distributing petrochemical feedstock at low cost.

- High level of integration and diversity across the value chain;
- Access to 80% of the European purchasing power within a 500 km radius;
- Federal and regional authorities support the industry to foster innovation in plastics technology & polymers:
  - Flanders' Catalisti is the competence pool of the plastics & rubber industry in Flanders;
  - PlastiWin is the plastics & rubber innovation cluster in Wallonia;
  - Vlaams Kunststof Centrum (VKC) is the Flemish centre of expertise for Plastics Technology;
  - SIRRIS is the Belgian centre of expertise for Materials Technology;
  - FISCH is Flanders' initiative for Sustainable Chemistry;
  - GreenWin is Wallonia's initiative for Sustainable Chemistry & Materials;
  - Factory of the Future is Flanders' initiative for Innovative Manufacturing.
- A network of academic research & educational institutes in plastics technology & polymer science: KUL University of Louvain, UCL University of Louvain, UGent – University of Ghent, University of Mons.

1.5.2. Training providers of apprenticeship and entrepreneurial training

Belgium is a federal state comprising three regions (Flanders, Wallonia and Brussels) and three communities (Flemish community (BEFL), French community (BEFR), and German-speaking community (BEDG)).

The following four organisations provide training in the field of apprenticeship and entrepreneurship[17]:

- SYNTRA Vlaanderen[18] in BEFL and Brussels for the Flemish-speaking apprentices;
- IFAPME in Wallonia;
- IAWM[19] in BEDG;
- SFPME/EFPME[20] in the Region of Brussels for the French-speaking apprentices.

These four organisations are under the responsibility of the Ministry of Employment and Vocational Training for Middle Class in Brussels; the Ministry of Employment and Vocational Training in Wallonia; the Ministry for VET in BEDG and the Ministry of Work and Social Affairs in BEFL, except for pupils still in compulsory education who fall under the supervision of the Ministry of Education.

The organizations are public bodies with a management committee composed of the regional social partners and a Government commissioner. Only the SFPME is an integrated service within the

[17] Entrepreneurship related training offered by providers are entrepreneurial training, continuing training for entrepreneurs', assistance and training for entrepreneurship and business creation.
[18] The Flemish Agency for Entrepreneurial Training works together with five regionally organized training centres.
[19] Institut für Aus- und Weiterbildung im Mittelstand und in kleinen und mittleren Unternehmen (Training Institute for small and medium-sized enterprises two centres).
[20] Le Service de la formation des petites et moyennes entreprise; The training service for small and medium sizedenterprises and its training Centre : « Espace Formation des Petites et Moyennes entreprises » (The training centre in Brussels for SME's).

French Community Commission administration in charge of vocational training for French speaking trainees in Brussels. In addition, the training centres are mostly non-profit organisations.

1.5.3. Government regulated VET provisions

The table below gives a summary of VET providers and programmes.

VET-programmes	**Organised/provided by**
Vocational secondary education: from the 3rd year of secondary education to the 6th Vocational secondary education: 7th secondary school-year (one more school year)	Schools for secondary education (all Communities) Schools for secondary education (all Communities)
Vocational secondary education, complementary/ specific qualifications: nursing programme (1, 2 or 3 years) Associate degree: nursing (HBO5)	Schools for secondary education (BEFR and BEDG) Schools for secondary education (BEFL)
Technical secondary education: from the 3rd year of secondary education Secondary after secondary education (7th year for complementary qualification)	Schools for secondary education (all Communities) Schools for secondary education (BEFL)
Dual system: part-time education for 15-25 years old	Schools for part-time education: CEFA, CDO, TZU[21]
Dual system: apprenticeship (15-25 years old)	SYNTRA Vlaanderen (BEFL and Brussels); SFPME/EFP (Brussels); IFAPME (Wallonia); IAWM (BEDG)
Secondary Adult Education: to obtain basic and secondary education certificate/diploma	Centres for adult education, (all Communities)
Associate degree Patent of higher education[22]	Centres for adult education, university colleges (BEFL) Centres for adult education (BEFR)
Professional bachelor [23] Specific teacher training programme	Adult education (BEFR) University colleges (BEFL) AHS[24] (BEDG) Centres for adult education: all Communities University colleges and universities: BEFL/ BEDG
Vocational programmes focused on labour market: jobseekers, workers	VDAB[25] (in Flanders + Brussels Dutch-speaking); Bruxelles Formation[26] (Brussels French-speaking); FOREM[27] (Wallonia); ADG[28] (BEDG)

[21] *Centres d'éducation et de formation en alternance* in BEFR (CEFA); *Centre voor deeltijds beroepsonderwijs* In BEFL (CDO); the *Teilzeitunterrichtszentren* (TZU) in BEDG. (Alternating training centers in Education).
[22] Professional Aptitude (CAP) or the Diploma of Occupational Studies (BES).
[23] In BEFL and BEDG; not yet formally included within the VET system in BEFR.

[24] Autonomous College in BEDG. Autonome Hochschule in der DG.
[25] Flemish Employment and Vocational Training Agency (*Vlaamse Dienst voor Arbeidsbemiddeling en Beroepsopleiding - VDAB*), operating also in Brussels for the Dutch-speaking jobseekers and trainees.
[26] The Brussels Institut for vocational training - Institut Bruxellois pour la Formation professionnelle (IBFFP).
[27] Employment and Vocational Training Agency in Wallonia.
[28] Employment and Vocational Training Agency in the German-speaking Community. *Arbeitsamt der deutschprachigen Gemeinschaft.*

Entrepreneurial training course, lifelong learning for entrepreneurs and additional courses	SYNTRA Vlaanderen (BEFL + Brussels Dutch-speaking) SFPME/EFP (Brussels French-speaking) IFAPME (Wallonia); IAWM (BEDG)
Validation / recognition of prior learning	Accredited centres (BEFL / BEFR)

1.5.4. VET system in Belgium

According to the European definition of qualification, the Belgian government-regulated VET system includes:

- secondary compulsory and upper secondary education with technical and vocational programmes (full-time and part-time);
- apprenticeship and entrepreneurial training;
- vocational training for learners with special education needs, adult education;
- higher education with vocational bachelor programmes[29].

Education is compulsory full-time up to 15 years and part-time after that age. Currently, programmes in the Belgian VET system start at the age of 14, if a pupil follows the normal progression. Until the age of 15, only one provider is in charge of VET in compulsory education: the schools, under the responsibility of the Ministry of Education[30], in each Community.

At the start of the third year of secondary education, the scope of VET extends to new providers besides the schools. Learners may decide to attend part-time programmes, alternating between work and learning, organised either by schools or by the training organisations of small and medium enterprises (SMEs). Moreover, even adult education may also provide courses for them or as a partner-provider for schools in some programmes. Once students have reached the age of 18, they are free to decide to remain in the education system[31], enter the labour market or go to any public or private vocational training provider. If students leave the education system without a secondary school certificate/diploma, they may progress to adult education.

At the age of 18, it is also possible to obtain at any time a qualification certificate through a skills centre. Essentially, government regulated VET systems in Belgium do not really differ in terms of public providers and their basic structure. The same types of structures exist in all regions/communities, but are sometimes known under another name. The main differences are the decision-making process and the implementation.

1.6 CONCLUSIONS

It is clear that the European industry needs to develop its strengths in advanced digital technologies and create a strong presence in traditional sectors to seize the range of opportunities that new technologies have to offer. This will create a digital skill need for nearly all jobs where ICT complements existing tasks. The digital technology already changed traditional learning paths by

[29] https://cumulus.cedefop.europa.eu/files/vetelib/2014/2014_CR_BE.pdf

[30] Regulated by the Ministry in charge of compulsory education and the various school organising authorities/bodies, in each community.

[31] To follow a seventh year, a fourth stage (in BEFR /BEDG, or an associate degree in the BEFL, higher education or adult education.

fostering online communities, enabling personalised learning experiences, and supporting the development of soft skills (problem-solving, collaboration and creativity). In order to combat falling labour productivity in all developed countries and deficits in innovation, there is a need for action from both industry and policymakers.

As the European economy is digitizing unevenly, with large variations among sectors and companies, digital skills became a priority when implementing a digital transformation. The demand from EU industry and enterprises for new types of skills highlights the need to reskill and reemploy the redundant workforce. With the Digital Single Market, the European Commission is set to prepare Europeans for the digital future.

The importance of the plastics processing industry in each country can be seen in the analysis of process partners. Each country has an efficient education system at VET level but uniting forces can be seen as a fruitful act to reinforce the professional development and to make the field even more appealing for both young people and experienced workers.

There is a need to adapt the European workforce and the education and learning systems, and this can be done with new vocational education and training that is designed to promote new types of skills, such as digital skills, green skills, entrepreneurial competencies, etc.

2 ANALYSIS OF VOCATIONAL TRAINING LEGISLATION (LEGAL FRAMEWORK, LAW OF EDUCATION, LAW ON VET, ETC.)

2.1 LITHUANIA

The development of the current education system in Lithuania started in the 1990s. Since 2003, the education system covers: preschool, general secondary, vocational, junior college, higher and adult education. According to the Constitution adopted in 1992, education is compulsory until the age of 16. Education at state and municipality general education schools, vocational schools and junior colleges is free of charge[32].

The main VET providers in Lithuania are called VET institutions and they are all the same type. Vocational education can be provided by a freelance teacher or other vocational education provider (general education school, institution, organisation, company whose main activity is not vocational training). A vocational education provider must have a licence issued by the Ministry of Education and Science. Pupils must be at least 14 to attend a VET institution[33].

VET in Lithuania is offered from lower secondary to post-secondary education (EQF levels 2-4). The vocational education system covers initial and continuing vocational education and training and the Ministry of Education, Science and Sport is responsible for the vocational education system. The Ministry is also a stakeholder in the majority of vocational education establishments and the majority of these are state budgetary institutions and some are self-governing institutions. The main governing body of public vocational education and training establishments is the general meeting of stakeholders in which each stakeholder has one vote. Municipalities, social partners, and other stakeholders may participate in governing a vocational education establishment on equal terms with the main stakeholder (the Ministry of Education and Science).

Vocational schools provide both training leading to a qualification, and basic or secondary education. The duration of the programmes can be either two or three years depending on whether it is intended to provide basic or secondary education or whether it is adapted to persons with special needs. The duration of studies for students who have already acquired secondary education is 1 to 2 years and requirements for vocational education programmes are set out by the General Requirements and Vocational Education and Training Standards of the Ministry of Education and Science. Vocational education programmes are developed by vocational education providers in cooperation with employers.

The education programme consists of two parts:

- The first part applies to all schools in the country and defines the fields of professional activities, competences, teaching goals, and assessment provisions.

- The second part is optional and covers teaching methods, subject programmes, teaching aids, etc.

The programme must include Entrepreneurship, Civil Protection, Ecology, Information Technologies, and Foreign Language for Specific Purposes as subjects or modules.

[32] http://www.euroeducation.net/prof/lithuaco.htm
[33] https://eacea.ec.europa.eu/national-policies/eurydice/content/organisation-vocational-lower-secondary-education-1_en

Of the total time allocated to vocational subjects 60-70% should be devoted to practical training. Usually, practical training is conducted at the school or in a company. Training can also be part of a mobility programme.

Using aid from EU Structural Funds, practical training centres for relevant branches of industry (sectoral practical training centres) equipped with modern facilities are being established at institutions of vocational education and training. A total of 42 sectoral practical training centres used not only by students of vocational education and training institutions, but also by students of universities and colleges. Well-equipped workshops are open to everyone who wishes to enhance or acquire a profession.

The sectoral practical training centre is a vocational education and training institution, or a division thereof, providing initial and continuing vocational education and training services to all residents of Lithuania and equipped with modern practical training facilities for one or several branches of industry[34].

Vocational school courses end in a final examination (theoretical and practical) which varies in content according to the curriculum. Students can be awarded the vocational qualifying certificate or the vocational education and training diploma. The vocational qualifying certificate and the vocational education and training diploma each grant the student access to an occupation.

Pupils who, in conjunction with the vocational training curriculum, have also completed the secondary education curriculum and passed final matura examinations (secondary school exit exam) are granted Maturity certificates which grant the student access to higher education institutions.

Vocational qualifying certificate are for students who have not completed basic school or for students who have completed post-secondary vocational schools. In all other cases the vocational education and training diploma is issued.

The qualifications awarded after the completion of vocational schools may vary depending on the training program curriculum. For example, environmental protection workers, painters, builders, plumbers, construction finishers, interior decorators, bakers, food preparation employees and others.[35]

Issued certificates:

Statement	**Years**	**Professional qualification**
Vocational qualifying certificate	14 - 16	Depending on the study program curriculum
Vocational education and training diploma and (basic school-leaving certificate or Maturity certificate)	16/17 - 18/19	Depending on the study program curriculum
Vocational qualifying certificate	Adult training	Depending on the training program curriculum

The final assessment of qualifications is an independent one and is assessed by accredited competence assessment institutions.

[34] https://www.smm.lt/web/en/education_1/vocational-education-and-training

[35] http://www.skvc.lt/default/en/education-in-lithuania/vocational

Having completed the vocational education programme and passed examinations, students obtain a vocational qualification. Students who have completed their secondary education can continue their studies in colleges or universities. Successful graduates as well as graduates who have work experience according to their qualification receive additional points when entering institutions of higher education.

2.1.1. Qualifications and Vocational Education and Training Development Centre

The Qualifications and Vocational Education and Training Development Centre (QVETDC) was established on 29 February 1996 by the order of the Minister of Education, Science and Sport.

The aim of QVETDC is to ensure the development of a Lithuanian lifelong learning system corresponding to the needs of the economy as well as national and international initiatives.

The objective is to manage Lithuanian qualifications system; to improve VET quality; to develop adult education system; to implement VET and adult education participants qualification development initiatives.

Fields of work consist out of: Qualifications framework; Standards and programs; VET quality; Adult education; Information, reports, analysis.[36]

2.1.2. Legal framework

The legal framework for education, including vocational training, is developed on the basis of European Union policies and principles and national priorities. The basic laws governing vocational training are: Law on Education, Law on Vocational Education, Law on Science and Studies, Law on Non-formal Adult Education, Law on Support for Employment. These documents determine the general principles of vocational education and training, which are detailed in secondary legislation.[37]

Main law documents regulating VET in Lithuania:

- The Law of Education;
- The Law of Vocational Education And The Law of Non-formal adult education.

2.2 FINLAND

The Finnish Government decides on the general goals of VET, the structure of qualifications, and the core subjects. The Ministry of Education and Culture is responsible for the studies and their scope. In Finland, general education is compulsory until the end of the year when a student reaches the age of 17.

VET for young people and adults is consolidated, forming a single entity with its own steering and regulation system and financing model. The approach is refocused into a demand-driven model where education is targeted to be competence-based and customer-oriented. Each student are given the possibility to design an individually appropriate path to finishing an entire qualification or a supplementary skill set. The primary importance focuses on what the student learns and is able to

[36] http://www.kpmpc.lt/kpmpc/en/
[37] www.kpmpc.lt/Skelbimai/PROFESINIS-MOKYMAS-lietuvoje-2009-LT.pdf

do. Digital learning environments and pedagogies (e.g. modern simulators) will have a larger role in the future of learning. On-the-job learning is increased.[38]

VET will be available throughout the country and it can be organised by different types of education providers: municipalities, joint municipal authorities, the state and the private sector. Education providers will have increased freedom in organising their activities by following regulation through a single authorisation license. The ministry of education and culture will ensure that all education providers have sufficient professional and financial resources to provide education. Education providers are encouraged towards voluntary mergers.

The number of different vocational qualifications available has been decreased to less than 200 in last few years. This will support students to individual study paths designs and enable more rapid responses to the changing competence needs in work life.

The Finnish VET education system demonstrating the versatility and flexibility of the education system appears as a flow-chart in Annex 1.

2.3 FRANCE

In France people can, throughout their lives, access education as part of a process of lifelong learning. In 2011-2012, 71.7% of people aged 14-22 were in education, or almost 15 million schoolchildren and students in total. In 2011, one in three employees participated in a training programme. Lifelong learning gives everyone a chance for education, either at school or university for pupils and students, or through vocational education and training for all working people, of all ages.

The resources provided for vocational education and training accounted for 1.55% of France's gross domestic product in 2012.

VET consists of two elements, which are relatively independent of each other:

- initial vocational training for young people in full-time education and for apprentices;
- continuing vocational training for young people who have left or completed initial education and to adults on the labour market.

Education extends to all ages, and includes opportunities for vocational and alternate training, whether within a school context or under an employment contract. In recent years, cooperation between schools and business has increased significantly and the links between them have multiplied.

The educational sector is also undergoing substantial development within the framework of EU policy.

2.3.1. Providing VET in a lifelong learning perspective

Lifelong learning includes initial training, apprenticeship, and subsequent training, which is continuing vocational training for adults and young people already engaged in active life.

Since an act passed in 2009, every working person has a right to a professional qualification. Under this right, everyone – whatever their status – is allowed to choose a training course that enables

[38] https://minedu.fi/en/qualifications-and-studies_vet

them to progress in their career by at least one level. This is possible through the acquisition of a qualification corresponding to the short- or medium-term needs of the economy. This qualification can be a national registered certification, recognised in the national professional classifications, or a certificate of qualification in a specific professional sector or cross-sector.

The State remains the only body capable of creating certifications that can be accessed through initial education. All the qualifications created by the State can also be accessed via lifelong learning and VAE.

Besides the state certifications, there are some other possibilities for training courses that lead to an evaluation which can qualify as a certification. In complement, with the state certifications, the other certifications are created and delivered by different bodies (ex: professional sectors, training centers, higher education schools), but always registered by the State. Some of them can only be obtained via a training course.

In other words, the methods for accessing different qualifications are flexible. It can be achieved through the initial education system, but also through lifelong learning. It should be noted that a qualification acquired through lifelong learning will have officially the same value as one obtained in initial education.

2.3.1. Main characteristics of the national education and training system

The system of VET refers to different levels of training. It begins at secondary high school level and continues until the higher level.

Each pathway prepares students to complete an exam in order to validate a certification. There are general certifications and vocational ones for a total of almost 18000 identified certifications.

The first one is the lower grade school certification. With or without this certification, there are several opportunities to continue on to upper secondary level and then to higher education but after that, just a few gateways exist between these pathways.

Higher levels open the possibility of a university degree. They reach different levels including Ph.D. At a level corresponding to the same value, other courses are available among other training providers, such as business schools, health and social establishments as well as the “Grandes écoles”.

The Minister of Higher Education and Research offers vocational qualifications running from level III (EQF level 5) to level I (EQF level 7) in the French qualification scale. For example, a very popular level 5 (EQF) certification is the Brevet de Technicien Supérieur (BTS – advanced technician certificate).

2.3.1. Education and training providers

In 2012, a total of 19 500 lifelong training bodies received revenues of 8.6 billion euros. 97% of them are in the private sector (for-profit companies, non-profit companies and individual training providers): They received three quarters of the revenues and more than 9 million people passed through their training centres, 86% of the total.

Private, for-profit providers, the largest section of the private training sector, represented 54% of the total number of providers in 2012. Alone, they trained 54% of people on courses and generated 50% of revenues. For their part, private, non-profit organisations (associations, unions, cooperatives, foundations, etc.) represent a fifth of training providers but 25% of the market in terms of revenue

and client numbers. Individual training providers represent 23% of the total, almost as much as the for-profit sector. However, they deal with only one in ten trainees, and receive only 3% of revenues in the sector.

Public and semi-public bodies are far less numerous: they only represent 3% of providers. However, they trained 14% of people on courses and received 21% of revenues in the sector[39].

The main public or semi-public bodies involved in lifelong learning programmes are:

- The GRETA (GRoupements d'ETAblissements – public educational establishment groups) created by the Ministry of National Education;
- The CNAM (Conservatoire national des arts et métiers) - a public institution that falls within the remit of the minister responsible for Higher Education;
- The CCI consular schools, which are attached to the Chambers of Commerce and Industry, attached to the Ministry of Economy. The consular schools, operating in the field of vocational higher education, include 29 higher business schools, 25 schools of management and commerce and 10 engineering schools;
- The AFPA (Association pour la formation des adultes – national association of adult vocational training) mostly provides training for job-seekers, using Regional or Government funds. With 232 centres, the AFPA provides courses leading to one of the professional qualifications issued by the Ministry of Employment.

In addition, all universities have a lifelong learning department, which offers adults access to most sectors of higher education.

The lifelong vocational training bodies, whether public or private, all operate in a competitive market.

2.3.4. Vocational qualifications

In France, the training market is free; this means that training bodies have no obligation to consult the State about the way they construct their courses and/or qualifications.

The three main certification beside these from the state are the CQP, the "titres d'ingénieur diplômé", (qualified engineer), the "qualifications des grandes écoles" (Business and management qualifications).

Certificats de qualification professionnelle (CQP – vocational qualification certificates) enable employees to acquire an operational qualification. The CQP, recognised by the collective or branch agreement it relates to, is thus created and issued within an industry sector by a joint industry body, usually the CPNE (National Joint Employment Committee). It should be noted that CQPs are not attached to a level of qualification but are classified separately in the RNCP (National Register of vocational certifications), by sector of activity. They can only be accessed through lifelong learning programmes and training is usually provided by a body created and managed by the branch in question.

Possessing the title "qualified engineer" (titre d'ingénieur diplômé) allows a person to work as an engineer. The education required to reach this level generally lasts 5 years after baccalaureate. It can be provided by public or private engineering schools. The title of "qualified engineer", which has

[39] www.cereq.fr/menus/pied_de_page/base_de_donnees/Enquetes-Formation-continue

both an academic and professional quality, is protected and controlled by the CTI (commission des titres d'ingénieur - engineering qualification committee): only institutions that are accredited by the CTI are allowed to award the title of "qualified engineer".

Business and management qualifications: Sixty business and management schools are authorised to award "State approved" qualifications. The "state approved" is a recognition procedure conducted by the Ministry of National Education which gives the diploma the value of a national qualification. It is granted for a maximum renewable period of 6 years. These grandes écoles are generally private structures managed by professional organisations. A State approved qualification provides access to the LMD cycle (Licence-Master-Doctorat), whether in France or abroad.

Apart from state qualifications, CQPs, qualified engineer titles and business schools, a training body can offer its own certifications based on its own set of criteria. Focusing on the skills required for the performance of a job identified on the labour market, a set of certification criteria specifies the procedures for assessing the candidates' mastery of these skills and for their validation by a certification jury, which reaches a decision following a qualification process (training course, work experience accreditation, etc.).

These certifications can be registered by application to the RNCP (national professional qualifications directory), following referral by the CNCP (national professional qualifications committee). If registration takes place, the certification is recognised as a national certification, with a level (from V to I), by the State and the social partners representing employers and employees.

In the absence of RNCP registration, these certifications are only "recognised" by the training body. However, they can be recognised by the professional community, i.e. allow a holder to obtain a job corresponding to the qualification acquired.

2.4 BELGIUM

2.4.1 Organizational structure of VET in Belgium

VET providers in the education system are part of school networks (public and subsidised private education). They pursue common objectives (e.g. provide intensive training, increase the number of traineeships' offers, etc.) and use common occupation profiles and VET standards, but have some level of autonomy.

Different socioeconomic realities in the regions mean that Flanders, Wallonia, the BEDG and the Brussels-capital region have different objectives and priorities. These are formalised in government strategies and plans which deal with language learning, new technologies, sustainable employment, training for young people or matching workforce skills to labour market needs.

Strategy, policies and all measures involving employment and VET are negotiated with social partners, leading to formal interprofessional agreements. Social partners are directly involved in organising programmes alternating work and training, and continuous vocational training through framework agreements.

2.4.2. The different VET branches in Belgium

Belgium's VET system is divided into full-time and dual programmes. The full-time programmes correspond to vocational education (for all communities), technical education in BEFL, technical qualification education in BEFR and BEDE. In the dual system, young people can choose between two

(BEFR) and three (BEFL) systems as of the age of 15, with the condition that they have at least successfully followed the first two years of full-time secondary school, or without any conditions as of sixteen years of age.[40]

In addition, there are part-time education programmes (provided by the formal education system) and apprenticeships provided by dual training providers in each of the communities and/or regions (SYNTRA Vlaanderen in BEFL and Brussels; in BEFR, the IFAPME is active in Wallonia and the SFPME-EFP in Brussels; the IAWM in BEDE).

Since 2016, new dual training programmes are being set up in BEFL in which students can also choose to follow technical dual pathways. In general, apprentices are trained for three years. The difference between the technical and vocational streams is situated at the level of the targeted vocational sectors[41] (commerce, construction, wood, etc.) rather than in the type of education that is imparted there. As a general rule, vocational education comprises more hours of practice and internship than technical education. The latter offers more hours of general training and is easier to access if not directly in higher education. In the construction sector, for instance, a person who graduates in Flanders vocational education[42] (BSO) is trained more in a manual trade (painting and decoration, for instance), whereas a young graduate from technical education (TSO)[43] will be generally specialised in the technical and coordination aspects of the worksite (for example, industrial techniques at the worksite).

2.4.3. National Reform Programme

A major influence on how VET is organised in Belgium comes from the institutional structure, with its regions and language communities and their political responsibilities. Despite multiple authorities responsible for education and training, and diverging education and training systems, there is political consensus.

The goals are defined in the National Reform Programme (2014)[44]:

- reduce early leaving from education and training;
- increase lifelong learning participation, increase access to and value of qualifications;
- reduce inequalities within each region.

2.4.4. Different funding schemes for VET in Belgium[45] VET funding in the French community (BEFR)

The management of the education system is organised by a Steering Committee that includes all relevant stakeholders. It is mandated to coordinate and to monitor consistency within the system and to support the implementation of reforms. The funding formula is the same in both technical and vocational as in general education, and the French Community bears the overall costs for the schools. It pays for teachers' salaries and provides operating grants to the subsidised schools.

[40] This concerns BEFL and BEFR but not BEDE, as the Community imposes access criteria, even for people older than 15 years old.
[41] In BEFL, the IVET streams in the education system provide programmes in 29 fields (construction, optics, sport, etc.) and some one hundred options for a given specialization and/or trade. On the French-speaking side, there are eight fields and more than one hundred options.
[42] Beroepssecundair onderwijs, vocational secondary education in Flanders.
[43] Technisch secundair onderwijs, technical secondary education in Flanders.
[44] https://ec.europa.eu/info/sites/info/files/file_import/nrp2014_belgium_en_0.pdf
[45] https://cumulus.cedefop.europa.eu/files/vetelib/2014/2014_CR_BE.pdf

In adult education, for the schools it organises directly, the French Community grants an allocation to the school's administration for all management costs. For subsidised institutions, funding is based on the number of regular registered students and number of training units.

2.4.5. VET funding in the Flemish community (BEFL)

There are no more differences in funding between the schools. Part of the operational education budget is primarily used to fund the objective differences between the schools and a further share is allocated based on the pupils' social characteristics (e.g. positive discrimination of schools in deprived areas).

Centres for adult education are fully financed by the Flemish Ministry of Education and Training on the basis of teaching hours. The students' registration fees are the only operational budget for the adult education centres.

2.4.6. VET funding in the German-speaking community (BEDG)

VET schools are publicly funded based on the number of learners. The equipment of these schools is partly or fully financed by the public authority.

The VET centres for the on-the-job-trainees are partly publicly funded (according to the number of students and duration (number of training hours); and partly self-funded by fees for trainings (entrepreneurship) and programmes for self-employed / independent workers.

In all private institutions for adult education learners have to pay registration fees, the amount of which depends on the type and volume of training or course and on the trainee's status. Public adult education institutions are financed as the VET schools by the public authority.

2.5 CONCLUSIONS

The VET systems in Europe are fragmented, organized according to national laws and adjusted for domestic purposes. However, there are similarities among different VET systems and analysis of four countries revealed that the systems can be adapted to change and enable new program implementation according to the needs of a market.

All analysed VET systems involve the private sector in order to respond quickly to the rapidly changing business environment. In Lithuania, vocational education programmes are developed by vocational education providers in cooperation with employers. In France, cooperation between schools and business has increased significantly in recent years and the links between them have multiplied. Furthermore, the Finnish VET system is organised by different types of education providers, like municipalities, joint municipal authorities, the state and the private sector.

France introduced a process of lifelong learning that gives everyone a chance for education. This includes pupils and students at school or university, but also vocational education and training for all working people. In addition, the VET system in Finland is widely regarded as versatile and flexible as it supports designing individual study paths and enabling more rapid responses to the changing competence needs in work life.

3 OVERVIEW OF QUALIFICATIONS FRAMEWORK, EUROPASS CERTIFICATE SUPPLEMENT, ECVET, NATIONAL QUALIFICATIONS FRAMEWORK

3.1 THE EUROPEAN QUALIFICATION FRAMEWORK

The European Qualifications Framework (EQF) is a common European reference framework whose goal is to make qualifications more readable and understandable across countries and systems. Covering qualifications at all levels and in all sub-systems of education and training, the EQF provides a comprehensive overview of qualifications in the European countries currently involved in its implementation. In close cooperation with the European Commission, Cedefop provides analytical and coordination support for the implementation of the EQF and carries out a number of comparative studies and analysis on issues related to the implementation of the framework at EU, national and sectoral level.

The core of the EQF is its eight reference levels defined in terms of learning outcomes, i.e. knowledge, skills and autonomy-responsibility. Learning outcomes express what individuals know, understand and are able to do at the end of a learning process. Countries develop national qualifications frameworks (NQFs) to implement the EQF. The main purpose of the EQF is to make qualifications more readable and understandable across countries and systems. This is important to support cross-border mobility of learners and workers and lifelong learning across Europe. In the 'Find and Compare Qualifications Frameworks' web page, it is possible to see how national qualifications levels of countries that have already finalised their referencing process have been linked to the EQF.

The EQF divides the entire range of qualifications into 8 levels[46]. The levels cover the full scale of qualifications, from basic (for example, they are evidenced by certificates of completion of general education or VET programmes) to the most advanced ones (level 8, for example, attributable to the doctoral degree). As the EQF seeks to promote lifelong learning, it covers all education sectors – general education, vocational education and training, and higher education. Qualifications acquired in the formal and continuing learning system, are also included in the framework.

3.2 EUROPASS CERTIFICATE SUPPLEMENT

Europass is a document prepared at the international level by the European Commission and the Council of Europe, which ensures the overall recognition of qualifications across Europe. The purpose of Europass documents is to help standardize and provide detailed information on personal education, vocational training, competences and skills. Europass consists of 5 documents to make skills and qualifications clearly and easily understood in Europe:

- *Two documents freely accessible*: 1. The Curriculum vitae helps you present your skills and qualifications effectively and clearly; 2. The Language Passport is a self-assessment tool for language skills and qualifications.

[46] http://www.cedefop.europa.eu/files/5566_en.pdf

- *Three documents issued by education and training authorities*: 1. The Europass Mobility records the knowledge and skills acquired in another European country; 2. The Certificate Supplement describes the knowledge and skills acquired by holders of vocational education and training certificates; 3. The Diploma Supplement describes the knowledge and skills acquired by holders of higher education degrees.

Europass Certificate Supplement is a document describing the knowledge and skills acquired by holders of vocational training certificates. It provides additional information to that already included in the official certificate and/or transcript, making it more easily understood, especially by employers or institutions abroad. The Europass Certificate Supplement is useful for various types of VET schools or additional VET courses for graduates and with appropriate education.

Responsible institutions for preparation of Europass documents:

- The Ministry of Education and Science of the Republic of Lithuania in Lithuania;
- The Finnish National Europass Centre at the Finnish National Agency for Education in Finland;
- Agence Erasmus+ in France;
- National Europass Center Flanders in Belgium.

3.3 EUROPEAN CREDIT SYSTEM FOR VET

The European credit system for VET (ECVET) is one of the important common European tools to support and increase European mobility. ECVET has been made to support learners on their career and learning paths to a recognised vocational qualification, through transfer and accumulation of their assessed learning outcomes acquired in different national, cultural and education and training contexts. In a broader sense, ECVET should contribute to promoting lifelong learning and increasing the employability of Europeans. ECVET calls for better transparency and mutual trust between education systems and providers, as well as more efficient and readable recognition of non-formal and informal learning.

ECVET can make vocational education and training more attractive to various groups of learners by ensuring flexibility of pathways and recognising all learning. It can contribute to fighting social exclusion and increasing the employability of the low-skilled by making it possible for them to have their competencies recognised and to get a qualification.

The focus of VET transnational mobility actions is IVET, mainly financed through EU and Nordic countries' support. The existing legal basis allows recognition of cross-border mobility.

The NQF, based on learning outcomes, was adopted in 2010. Legislation (2009, amended in 2015) set up a structure of occupational standards. The commitment for introducing a credit system has been formalised in the 'concept of modular VET' and the methodology for developing modular programmes, which describe how to define the volume of VET programmes in ECVET credit points. Measures to modularise VET were included in the 2007 development programme and in the 2010 legislation (amended in 2015): 17 modular VET programmes were finalised in 2014 and 23 will be finalised in 2015. Validation of VET level qualifications is organised according to the Order on the evaluation of a person's acquired competences (2012) and is implemented by accredited competence assessment institutions.

A measure for implementation of the recommendation of the European Parliament and of the Council of 18 June 2009 on the establishment of a European credit system for vocational education and training (ECVET) (2009/C 155/02[47]) is included in the Action plan on VET development 2014-16 (2014). A community of practice started to be developed in 2014. A national team of ECVET experts was established in 2014[48].

3.4 LITHUANIA

3.4.1. National qualification framework

Designation and Framework of Qualifications System in Lithuania, Formation and Management of Qualifications, Assessment of Competences and Award of Qualifications are described in the Law of VET.

Like the European Qualifications Framework (EQF), the Lithuanian Qualifications Framework (LTQF) has 8 qualification levels. Levels of qualifications are arranged hierarchically, in accordance with the criteria defining qualification levels: complexity, autonomy and a range of activities which a person with certain qualifications can be expected to carry out. The LTQF includes qualifications for working and learning, the main purpose of which is to prepare a person for further learning. Such qualifications are acquired upon completion of general lower or upper secondary education programmes.

VET qualifications are attributed to the first five levels of the LTQF in the Lithuanian qualifications system. Qualifications at levels 1-4 are acquired by completing vocational education and/or general education programmes, whereas qualifications at level 5 are acquired by completing training programmes intended for people with a vocational qualification and professional experience, higher education programmes not leading to a degree, and/or through professional experience and independent study.

Level 6 qualifications are acquired by completing cycle one of university or college studies and, in certain cases and according to the procedure specified in legislation, by completing study or requalification programmes not leading to a degree.

Level 7 qualifications are acquired by completing cycle two of university studies or integrated study programmes, in cases and according to the procedure specified in legislation, by completing study or requalification programmes not leading to a degree.

Level 8 qualifications are acquired by completing doctoral studies. In addition, qualifications at all levels may be acquired by gaining professional experience or by independent study[49].

3.4.2. Apprenticeship

According to the Law of VET, the vocational training system covers the primary vocational training, continuing vocational training and career guidance. Initial vocational training as the first qualification can be completed together with primary or secondary education program. The purpose of continuing vocational training is to improve a person's qualification, to help with the acquisition of

[47] https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2009:155:0011:0018:EN:PDF
[48] http://www.cedefop.europa.eu/files/5556_en.pdf
[49] https://www.kpmpc.lt/kpmpc/en/information/qualifications-framework-2/

another qualification or the competencies necessary for carrying out a job or performing a function. Vocational training can be organized either at school or at school in the form of apprenticeship.

The concept of apprenticeship was incorporated into Lithuanian legislation on vocational training after the adoption of new legislation Law on VET (2007, came into force 2008-01-01). This law establishes the definition of Apprenticeship as follows: "Form of apprenticeship training - when training is carried out in the workplace: in the company, an institution, organization, farm. Theoretical training can be provided by vocational training school or other school."

The need for apprenticeship is related to the need for companies to have a sufficient number of skilled workers. The opportunities offered by apprenticeships are related to the goal of closer cooperation between training institutions and enterprises, and to guarantee high quality practical training. Often the qualifications of trained specialists do not fully meet the needs of employers, and practical skills are not sufficient to successfully establish themselves in the labor market. Introducing and developing apprenticeships is one of the most important developments of vocational training in Lithuania strategic objectives. Apprenticeship in Lithuania is implemented through various projects.[50]

A diagram showing the education system in Lithuania is given in the Annex 2.

3.5 FINLAND

Finnish teachers are highly educated and strongly committed to their work. The Education system is grouped into 8 levels of education (EQF) and is built to avoid dead ends so that learners can always continue their studies on an upper level of education. The educational system is able to take the individual needs of the students into account and it is possible to update one's knowledge and skills at whatever stage in one's career. Funding of the studies is designed so as to encourage effectiveness and discourage students from quitting a program . A diagram showing the education system in Finland is given in the Annex 3.

The main objective of the Finnish education policy is to offer all citizens equal opportunities to access education and the structure of the education system reflects that. Education is one of the cornerstones of the Finnish welfare society offering equal opportunities for all and education from pre-primary to higher education is free of charge. The new core curricula for pre-primary and basic education adopted in 2016 focus on learning, not steering. The only national examination, the matriculation examination, is held at the end of general upper secondary education. Commonly admission to higher education is based on the results in the matriculation examination and entrance tests.

Since the early 1990s, governance has been based on the principle of decentralization, and education providers are responsible for practical teaching arrangements as well as the effectiveness and quality of the education provided. Since the early 1990s, governance has been based on the principle of decentralization, and education providers

Universities and universities of applied sciences (UAS) enjoy extensive autonomy. Daily work of UAS and universities is built to organise their own administration, decide on student admission and design the contents of degree programmes.

[50] https://www.smm.lt/uploads/documents/kiti/pameistryste-lietuvoje.pdf

Most education and training is publicly funded and there are no tuition fees at any level of education except for non-EU and non-EEA students in higher education, effective from autumn 2016. In addition in basic education, school materials, school meals and commuting are also provided free of charge.[51]

3.6 FRANCE

Professional certifications include vocational qualifications and diplomas awarded on behalf of the State by certain Ministries, but also those created by other bodies such as:

- the vocational qualification certificate (certificat de qualification professionnelle - CQP) created by the social partners of a branch;
- title of "qualified engineer" (titre d'ingénieur diplômé) created and controlled by the CTI (commission des titres d'ingénieur - engineering qualification committee);
    - vocational certificate (certificat professionnel) created by public or private training providers such as consular schools, CNAM (Conservatoire national des arts et métiers), AFPA (Association pour la formation des adultes – national association of adult vocational training) and private establishments in their own name.

A diagram showing education and training system in France is given in the Annex 4.

3.6.1. The development of certifications awarded on behalf of the State

Certifications produced by Ministries are created based on opinions by consultative bodies, which may be:

- Professional consultative committees (CPC - Commissions professionnelles consultatives);
- National bodies responsible for assessing training courses on behalf of the Ministry of Higher Education.

3.6.2. Preparation of certifications in ministries with a Professional Consultative Committee (CPC)

The CPC are made up of representatives of employers, employees, the government and qualified individuals and are divided into major spheres of economic activity. So far, six Ministries have set up such committees. The Ministries of Social Affairs, of Agriculture, of Youth and Sport and Culture each have a CPC.

As for the Ministry of Employment, it has several CPCs in the following spheres: construction and public works; wholesale and retail trade; industry; management and data processing; the tourism, leisure, hotel and restaurant sectors; transport and logistics; and "other services to businesses, local authorities and individuals".

The Ministry of National Education manages the largest number of certification processes and has the most sophisticated procedure. For the purpose of developing and updating its professional qualifications, the Ministry relies on 14 CPCs, corresponding to the main business sectors in the economy. At the Ministry, any plan to update or create a qualification is preceded by an opportunity study. As soon as the relevant CPC reaches a decision, the directory of professional activities is drawn up based on an analysis of actual jobs and job trends, together with a certification directory

[51] https://studyinfo.fi/wp2/en/vocational-education-and-training/fields-of-vocational-education-and-training/

which defines the expected skills outcomes, associated knowledge and assessment and approval procedures.

Moreover, any plan to update or create a National Education qualification is submitted to other official consultation bodies:

- the Higher Council for Education (CSE - Conseil supérieur de l'Éducation): chaired by the Minister of National Education or their representatives, made up of representatives of teachers, parents, high-school pupils, students, local authorities and voluntary organisations;
- the Consultative Inter-professional Committee (CIC - Comité interprofessionnel consultatif) is consulted on general questions relating to professional and technological qualifications. It also works on future trends in education (general, technical and vocational). The Committee also works on cross cutting issues affecting all the CPCs.

3.6.3. The development of certification in the professional sectors

When they decide to create their own certifications, the professional bodies generally rely on work done by two of their structures:

- the joint employment and vocational training committees (CPNEF - Commission paritaire nationale de l'emploi et de la formation professionnelle);
- the qualifications and employment perspectives observatories (OPMQ - Observatoires prospectifs des métiers et des qualifications).

Professional organisations are free to implement the method that suits them best to develop their certifications. However, in March 2012, the Joint National Committee for Professional Training (CPNFP) published a "Methodological guide for use by the CPNE" for the creation of Professional Qualification Certificates (CQP). The proposed approach is to:

- conduct an opportunity study to confirm the relevance of creating the CQP;
- draw up activity and qualification (and possibly training) lists;
- develop tools and procedures for assessing applicants;
- Formalise the process for implementing the different stages leading to the acquisition of the CQP.

3.7 BELGIUM

3.7.1. Certification and qualifications frameworks[52]

The certification is traditionally associated with certificates and diplomas issued by education and training providers organised by the Communities, with these benefiting from legal recognition. On the basis of the European reference definition (without taking into account private certifications which are becoming increasingly common) other certifications issued by public providers have gradually begun to appear in the field of VET:

- certificates issued by training providers which are recognised by all Communities (or are in progress);

[52] https://www.refernet.de/dokumente/pdf/2016_CR_BE.pdf

- the skills certificate awarded by the CVDC (Consortium de Validation des Compétences, Skills Validation Consortium), certifies the recognition of particular competencies associated with a profession, but not legally recognised as a diploma;
- certificate of vocational experience (Ervaringsbewijs), provided by a test centre accredited by the Flemish Government (www.ervaringsbewijs.be);
- certifications issued by three French-speaking public vocational training providers, through the Certificate of Skills Acquired during Training (CECAF - Certificat de compétences acquises en formation).

A Training Skills Certificate is awarded once a unit has been successfully completed or following completion of the training pathway. The supplement to the European certificate, EUROPASS, is awarded in annex. The three Communities have their own qualification framework, but share similarities like eight qualification levels or two entry pathways and the same type of descriptors.

3.7.2. The qualifications structure in BEFL

The Act on the Flemish Qualifications Structure (FQS) was adopted in 2009 and consists of eight levels, described with elements of knowledge, skills, contextual elements, autonomy and responsibility. Within this framework, there are two kinds of qualifications: the 'professional qualification and the 'educational qualification. The professional qualifications are based on the content of 'Competent[53]', and educational qualifications (e.g. a secondary education certificate, a bachelor's or master's degree, an associate degree) are developed by and can therefore only be obtained through educational partners. The vocational education programmes will lead to an educational qualification wherein at least one professional qualification is integrated.

When a pupil is 15 or 16 years old (s)he may enter a system of alternating learning and working. All pupils in part-time education are obliged to take part in learning and working for at least 28 hours a week. Part-time learning and working are organized in:

- a centre for part-time education;
- a centre for apprenticeships.

In a Centre for Part-time Education (Centrum voor Deeltijds Onderwijs) pupils take classes for 15 hours a week. These classes are supplemented with a working experience which matches the programme. Pupils who are not yet ready to work in the regular economic circuit may fill the remaining 13 hours with a preparatory pathway or a bridging project with a recognized promoter or with a personal development pathway in a Centre for Part-time Training (Centrum voor Deeltijdse Vorming).

In Flanders apprenticeships are organised in a SYNTRA training centre (SYNTRA opleidingscentrum). SYNTRA is the Flemish Agency for Entrepreneurial Training.

3.7.3. The qualifications framework in BEFR

The national qualification framework of the French-speaking community has been developed and approved by all VET providers' managing committees. It was linked to EQF at end of 2013 and mid 2015 the NQF was legally adopted. A dual sector framework principle was adopted: one sector for

[53] Database containing all occupational profiles and information on competences, presented in the form of a detailed description of professional activities and the related knowledge and skills.

the eight levels for all education certifications; one sector for the eight levels for vocational training certifications and skills validation certificates.

3.7.4. System of alternating learning and working

The conditions for a pupil to enter a system of alternating learning and working are the same as in the case of BEFL. Moreover, as in the case of the Flemish system, part-time learning and working is organized through a centre for part-time education or a centre for apprenticeships. Pupils attend classes for 15 hours a week in a Centre for Dual Vocational Education (Centre d'Enseignement et de Formation en Alternance -CEFA), and the classes are supplemented with a working experience. Pupils can obtain the same certificates and qualifications as in ordinary full-time qualification-stream education, or lower levels of qualification via specific profiles.

Apprenticeships are organised by IFAPME (the Walloon Institute of Dual Vocational Education and Training for Small and Medium-Sized Enterprises) and the SFPME (Small and Mid-Sized Companies Training Service in the Brussels-Capital Region).

3.7.5. Qualifications framework in BEDG

The Decree on the Qualification framework of the German-speaking Community was adopted in November 2013. The decree emphasizes that VET and general education should be equivalent. Within this framework, there are two kinds of qualifications: the 'professional qualification' and the 'educational qualification'. The regional qualification framework of BEDG consists of eight levels, described with elements of knowledge, skills, contextual elements, autonomy, responsibility and social competences.

3.8 CONCLUSIONS

An overview of each country's education system leads to the conclusion that there are certain differences between the systems of each country. There are different qualifications assessment bodies, some legal acts regulating assessment. However, the most important thing for all countries is The European Qualifications Framework (EQF).

The European Qualifications Framework (EQF) is a translation tool that helps communication and comparison between qualifications systems in Europe. Its eight common European reference levels are described in terms of learning outcomes: knowledge, skills and competences. The Council of the European Union has adopted a Recommendation on the European Qualifications Framework for Lifelong Learning which divides the full spectrum of qualifications into 8 levels and provides descriptions of their learning outcomes - knowledge, skills and competence acquired to help to improve education and training systems, to increase employability, mobility and social inclusion for workers and learners. The Recommendation also aims to better connect formal, non-formal and informal learning and to support validation of learning outcomes achieved in different settings.

This allows any national qualifications systems, national qualifications frameworks (NQFs) and qualifications in Europe to relate to the EQF levels. Learners, graduates, providers and employers can use these levels to understand and compare qualifications awarded in different countries and by different education and training systems. It is important to work in harmony with the above provisions.

4 COMPARISON AND ANALYSIS OF OCCUPATION PROFILE AND EXISTING CURRICULUM FOR PLASTIC PROCESSING (INVOLVING EQF, EUROPASS)

Project partners analysed existing curriculum for plastic processing in Lithuania, Finland, France and Belgium. The Lithuanian partner analysed Injection molding machine setter training programme which is the only formal training programme in Lithuania. The structure, skills and competences which students can obtain on the current training programme were analysed. This training programme was designed in 2014 and has never been reviewed or updated setter. Consequently there is demand and need from business companies and VET providers to design new modular training programme for plastic molding machines setters.

The Finnish partners analysed the Mechanical Engineering and Production Technology training programme which includes Plastic and rubber modules. This training programme is implemented at Tredu. Two competence areas and five qualification titles were analysed.

The French partners analysed Production Setter in plastics processing industry training programme which is implemented at ISPA. Competencies and training objectives, knowledge which is acquired on this training programme were analysed.

The Belgian partners described the situation in different country regions and the available training programmes related to plastic processing.

4.1 LITHUANIA

There is only one formal VET training program related to plastic processing in Lithuania - Injection molding machine setter (state program code 262071101), EFQ level 2.

The qualification consists of competencies that a person must achieve to prepare molds for composites production, assemble materials and equipment for production, operate injection molding equipment and blow molding equipment. It also includes a competency to monitor process operations and to finish products and components. Lower Secondary Education is necessary to study in this programme.

The teaching lasts 37 weeks (1480 hours). Students' weekly workload is 40 academic hours. Practical training consists of 70 percent training time. To maintain learning integrity, theoretical training is integrated into practical training.

The main objective of the training program is to prepare an injection moulding machine setter who is capable of preparing the equipment, setting the right parameters, controlling the process, reacting to problems in the process and solving them.

4.1.1. Competences and training objectives

COMPETENCES	TRAINING OBJECTIVES AND KNOWLEDGE
Creating a safe working environment	The requirements of the legal and normative work safety regulations of the Republic of Lithuania and the procedure of their implementation

	The dangerous factors of the working environment
	The rules of work safety, electrical safety, fire safety, protective measures against dangerous agents when working with plastic materials and with molding machines and additional production equipment
	Check the settings of the equipment
	Understand the damaging effects of man-made activities for the environment
	Get first aid
Working on molding machines	The structure of molding machines
	The different types of molding machines used by the manufacturers
	Molding machine maintenance
Using plastic materials at work	The history and origin of plastics
	The properties of plastic and plastic materials and their application possibilities
	The use procedures in the injection molding process
	The differences between thermoplastics and thermoset and between amorphous and semi-crystalline plastics
Molding Machines maintenance	Change molds
	Connect and use additional equipment
	Understand clamping and injection settings
	Prepare plastic for the production process and control the temperature
Molding process maintenance	Understand the cycle of the molding process
	Resolve molding problems
	Maintain of the double- pouring process
	The importance of optimizing the molding process

4.1.2. Overview of key learning subjects

- Molding machines and their maintenance

The purpose of the subject: to provide knowledge about the structure of molding machines, their types; to learn how to regulate molding machines and understand the principles of molding machines, to help understand and teach control over the molding process.

The expected results	**Tasks of the subject**
Understanding the structure of molding machines	The main components of molding machines and their functions and purposes
The types of molding machines used by manufacturers	The main differences between molding machines. Identify and differentiate the types of molding machines
Controlling molding machines	Control the work of molding machines

- Molds and mold change procedures

The purpose of the subject: to provide knowledge of the different types of molds and their structure, to teach correct and safe mold change procedures, and properly attach all the necessary additional equipment.

The expected results	Tasks of the subject
Understanding the procedures which must be carried out during injection molding process	Introduction to different types of molds
Performing mold replacement procedures	Learn about mold replacement procedures and how to attach all the necessary accessories to them

- Plastic materials

The purpose of the subject: to provide knowledge about the plastic materials which are used in the injection molding process and about the types and properties of plastic materials.

The expected results	Tasks of the subject
Knowing the history and origin of plastics	Introduction to the history of plastics
Knowing the differences between thermoplastics and thermoset and between amorphous and semi-crystalline plastics	Learn about different plastics in different groups and understand the terminology used in the plastics industry
Knowing the properties of plastic and plastic materials and their application possibilities	Introduction to the properties of plastic materials and discussing their use in industry

- Molding process

The purpose of the subject: to provide knowledge about the injection molding process, the injection molding cycle parts, to explain what is happening in the molding machine and the plastic during each part of the molding cycle.

The expected results	Tasks of the subject
Changing molds	Explain the molding cycle and its separate parts
Connecting and using additional equipment	
Understanding clamping and injection settings	
Preparing plastic for the production process and control the temperature	

- The solutions for problems in the plastic molding process

The purpose of the subject: to teach how distinguish different types of product non-conformity with quality requirements, to explain how different molding process problems arise and how to solve them.

The expected results	Tasks of the subject
Understanding the molding process cycle	Explain problems arising in the molding process and their solutions
Solving molding problems	

- Monitoring of the molding process

The purpose of the subject: to provide knowledge about the importance of the molding process monitoring, to explain the influence of different parameters on product quality and the necessity to control these parameters.

The expected results	Tasks of the subject
Understanding the molding process cycle	Effective monitoring of the molding process

Knowing the importance of optimizing the molding process	
Maintaining molding machines	
Checking the settings of the equipment	

- Optimization of the moulding process

The purpose of the subject: to explain the main parameters of the injection molding process and possibilities for optimization, to explain the importance of molding parameters optimization for the stability of the molding process and reduction of production costs.

The expected results	**Tasks of the subject**
Knowing the importance of optimizing the molding process	Optimize the parameters of the molding process
Maintaining molding machines	Optimize the cooling parameters
Connecting and using additional equipment	Optimize the clamping force

4.1.3. The new expected modular VET programme

In 2018, Visaginas Technology and Business Vocational Training Center, in cooperation with industry and Alytus Vocational Training Center started developing a training program for plastic molding machines setters. At present, a large part of the manufacturing sector consists of the molding of plastic products.

Consequently, a modular training program for plastics molding machines should be developed, covering the following subject competences: the history of plastic materials and the type of plastics; the structure, execution and control elements of plastics molding, blowing and extrusion equipment; plastic materials and molding processes; the structure of molding forms; the basics of pneumatics and hydraulics; the fundamentals of electrical engineering and electronics; to be capable of operating molding, blowing and extruder machines; to change molds and blowing forms; to evaluate the molding process and the final result; to identify the main molding defects; to solve the inherent problems; to optimize the molding process; to acquire the basics of automation, robotics control systems and practical skills.

4.2 FINLAND

Since 2018, plastic and rubber orientated studies have been implemented VET training program called Mechanical Engineering and Production Technology. The vocational qualification in mechanical engineering and production technology comprises two competence areas and five qualification titles:

- Competence area in assembly and automation (Automation Assembler, Mechanical Fitter);
- Competence area in production technology (Machinist, Plater-welder, Maker of Plastic and Rubber Products).

4.2.1. Profile of skills and competences

4.2.1.1 Composition of the qualification

The scope of a vocational qualification in Mechanical engineering and production technology is 180 competence points. The qualification is composed of vocational units (145 cp) and common units (35 cp).

Vocational units are dealt in categories:

- compulsory vocational units in the qualification 65 cp:
  - 35 cp from units that are compulsory for all competence areas;
  - 30 cp one compulsory qualification title -specific unit (in this case plastic and rubber).
- Optional units 40-80 cp specific to the qualification title, a part of unit can be chosen also from other qualification titles.

4.2.1.2 Vocational skills and competences required for completion of the qualification

Makers of plastic and rubber products know the production techniques and manufacturing methods of their field and are familiar with the used materials. Qualifications holders are able to work in tasks related to the manufacture, testing, and quality control of products, servicing and maintenance of the machines they use and warehousing activities. They are able to work economically and safely in production and in the work community and make sure their work is of good quality. Professionals in the field of plastic and rubber products may work as part of production in which different products are manufactured ranging from simple disposable products to hugely expensive cutting-edge technical products. For example, the work task may involve usage or monitoring the rotation automated extrusion, injection moulding, blow moulding, thermoforming or rotational forming processes in mass production. In addition, they are able to work in factories dominated by manual work phases or use modern manufacturing techniques and robotics to make and finish products.

Plastic and rubber modules are given broad open titles in order to meet the future needs. Moulding of plastics covers topics such as injection moulding/blow moulding/ rotation molding. Plastics extrusion covers pipe, sheet and profile extrusion, one module covers thermoforming, joining techniques and plastic welding. Composites and rubber both have their own modules. If a student need more than one method in the module some of modules can be chosen twice. He or she can therefore demonstrate skills with the other method and get competence points for both. Vocational modules in plastic and rubber are written similar to the production process: safety first, process start, use, stop, product quality, packing and storage actions, last reporting and evaluation. This makes it possible to adopt students' studies to meet the needs of industry. The assessment is done using the scale 1-5 and the descriptions are included in national course descriptions. For example, the headings for the plastics extrusion professional qualifications below indicate the student can:

- prepare or check condition of workplace;
- work with materials selected;
- use the production process;
- check the quality of the product, pack and storage it;
- work as a member of the labour force and know requirements of work safety.

Targets are written for each of the headings. For the first heading, "prepare or check condition of workplace", in order to get grade 5, a student has to demonstrate how well and independently he or she checks the working area, equipment and processes details as the local needs require and how he/she can securely solve most common distractions and find even applied solutions.

Europass certificate supplement for Mechanical Engineering and Production Technology training program equals to EQF level 4.

4.3 FRANCE

In France, the VET training programs related to plastics processing are numerous and they have been elaborated by different accreditation bodies, generally depending on the targeted beneficiaries. Among these different VET programs, the "Setter of production in plastics processing industry" (preparing the certification "Plastics Production Technician" (TPP), accredited by the French Ministry of Industry), seems to be particularly adapted to the Upskill project. The following sections present the competences, the training objectives and an overview of the key learning subjects. Moreover, this program is being engineered by ISPA with the objective of opening the first class in September 2019.

The program is based on the following elements:

- Total duration (Training center + company) : 1730 hours (Variable);
- Duration in ISPA training center: 266 hours;
- Duration of elearning: 108 hours;
- Duration in company: 1356 hours (Variable).

The e-learning training time is composed of 76 hours strictly tutored elearning and 32 hours of virtual classroom.

4.3.1. Competencies and training objectives

ACTIVITY TYPE 1: Adjust and launch an automated plastic production line and monitor its operation	
COMPETENCES	**TRAINING OBJECTIVES**
Mounting tooling and preparing for plastic production	Operate a Manufacturing Document, a Manufacturing Order
	Monitor the proper condition and operation of safety and protective cowlings
	Supply materials, containers, components, consumables, small equipment useful for the production of parts
	Move, manipulate, position a load and deconditioning products from a container
	Verify and control the reference of a supply component
	Handling screen pages for a plastic machine control console
	Handling screen pages for a plastic machine control console. Attach tools to machine by clamping or magnetism
	Make hydraulic, electrical and pneumatic connections between tools, machines and peripheral equipment
	Check the efficiency of an energy connection
	Load the machine and robot program on a machine control console
	Attach and connect energy to a robot or sprue grip

	plate
	Initialize a robot or sprue grip plate
	Adjust or have settings done for devices such as colourator, material mount, dryer, temperature controller and put them into operation
	Cleaning machine and tool components
	Fill in a result on a production tracking document, a computer terminal or a touch screen
	Respond to any manufacturing accident or incident
	Distribute certain tasks
	Organize into a hierarchy and organize the operations
Starting up and shutting down a plastic production line	Operate a production document, a production order
	Handling the control console of a plastics machine
	Start up and shut down a production line, a robot
	Control products with recommended devices
	Set and adjust main machine settings
	Enter a result on a production tracking document, a computer terminal or a touch screen
	Be alert and react to abnormal symptoms: vibration, noise, heat, smell
	Calculate an end of manufacturing date
	Organize one's workspace
	Follow rigorous methodological processes
	Organize into a hierarchy and organize the operations
Monitoring the conformity of produced parts and stabilizing the process of plastic production	Exploit a quality document
	Verify validity date of calibration of control instruments
	Handle a means of control according to the operating instructions
	Perform dimensional, physical, functional and aspect measurements
	Carry out a proper functioning test
	Compare a measurement result to a tolerance interval
	Visually or tactically assess a result against a reference
	Analyse and react to a drift on a control card
	Analyse the stability of manufacturing parameters on machine screen graphics
	Identifying necessary changes in manufacturing parameters in order to remove an abnormality
	Fill in a result on a quality tracking document, a computer terminal or a touch screen
	Maintain order and cleanliness, have a tidy workplace
	Organize one's space of control
	Follow rigorous methodological processes
Diagnosing and helping to solve a	Position the installation in the recommended state

malfunction on a plastic production line	Globally identify the defective function of a machine
	Detect manufacturing abnormalities related to tooling
	Analyse and assess a risk due to the nature of a defective element
	Reading and comparing energy indicator results with a given data: pressure, temperature
	Clean and lubricate a mechanical element
	Warn about electrical, mechanical, pneumatic, hydraulic and thermal hazards
	Enter a result or indication on a production tracking document, computer terminal or touch screen
	Maintain order and cleanliness, have a tidy workplace
	Sorting waste
	Organize one's space of control
	Follow rigorous methodological processes
ACTIVITY TYPE 2: Organize production and optimize the manufacturing process on an automated line of plastic production	
COMPETENCES	**TRAINING OBJECTIVES**
Coordinating the activities of production operators	Calculate a workload
	Present a workplace
	Explain the tasks to be carried out
	Anticipate unforeseen situations
	Distributing workload to a team
Helping production operators to adapt to the workplace	Writing a simple information or training medium
	Use computer tools such as word processing, spreadsheet, document presentation
	Establish and draft a report
	Verify results against assigned objectives
	Analyse, synthesize and memorize information from various sources
	Follow rigorous methodological processes
	Organize and coordinate actions
	Follow and accompany the staff
	Organize a visit of the workshop
	Use the manufacturing technical document statements
Proposing technical or organisational improvements to a plastic production line	Use problem solving tools
	Draft an explanatory note
	Identify and measure the effects of a planned improvement
	Participate in simple adaptive work on the manufacturing line
	Use computer tools such as word processing, spreadsheet, document presentation
	Explain the profits of an improvement
	Taking into account basic economic criteria
TRANSVERSE SKILLS	

COMPETENCES	TRAINING OBJECTIVES
Team-working	Communicate orally and in writing with the environment
	Take into account the information transmitted
	Guide the actions of an operator
	Reporting
	Make decisions and demonstrate responsiveness
	Listening and integrating operator feedback
	Check operators' understanding
	Passing on one's technical know-how
	Welcoming an individual, defining his role, activity, workplace and production objectives
	Comment on the content of the Welcome Booklet
	Working in a multidisciplinary working group and team
	Develop technical and relational links
	Explain and argue a modification
	Express one's needs to different stakeholders
Diagnosing a problem and solving it	Analyse, synthesize and memorize information from various sources
	Follow rigorous methodological processes
	Organize data collection and compilation
	Integrate information from various sources
	Adaptto different types of situations
	Write a report of incidents or material deterioration
Applying hygiene, safety, environment and health rules at work	Apply a procedure, a modus operandi or a HSE rule
	Educate, enforce and verify appropriation of HSE procedures and instructions
	Use and get operators to use Personal Protective Equipment
	Maintain order and cleanliness, have a work place cleaned and stored
	Sorting waste

4.3.2. Overview of key learning subjects

This section describes the knowledge that it is considered to be acquired, in accordance with the competence above, in order to ensure a high level of expertise of the "Setter of production in plastics processing industry".

4.3.1.1 Prepare and successfully integrate the job

Theme	Knowledge
1.Integration	The trade repository, evaluation procedures (certification repository)
	The program and planning
	ISPA, its activity, its organization
	Different ISPA stakeholders during training
	The rules of how the training works (rights, duties, regulations, etc.)
	The Tripartite Learning Relationship Learner - Enterprise - Training Centre

	Trade repository, evaluation
2.Mathematics	Units of measurement and calculation of unit conversions
3.Expression and professional communication	Forms of communication such as bottom-up, top-down, internal, external
	Modes of communication such as oral, written and visual communications
	Communication situations such as meeting, face-to-face, technical briefing, passing instructions
4.Industrial technologies	Introduction to the following technologies and their risks: automatic, electrical, mechanical, pneumatic, robotic and hydraulic Knowledge of the structure of a report
	Different energies, associated hazards, circuit types and energy connections
5.Office digital tools (Word processing, table, presentation)	Basic functions of Microsoft Suite software (Word, Excel, Powerpoint) for: ○ Write, format and disseminate a memo ○ Achieve a graphical data table for exploitation ○ Develop a presentation for a meeting intervention
6.Business knowledge and professional behaviour	Different functions in the business and their interactivity
	Customer-supplier relations
	Technician's field of intervention in the company's production system
7.Knowledge of plastics (polymers/composites/bio-based plastics)	Characteristics of thermoplastic materials and their processing
	Origin and composition of plastics (Method of obtaining, thermoplastic, thermoset)
	Properties of polymers (Physical-chemical characteristics of a polymer, relationship between structure and properties, consequences of the presence of additives)
	Behaviour of plastics during processing (Injection, extrusion)
	Fields of application of plastics used in industry
8.Professional integration	Cover letters
	CV

4.3.1.2 Adjust and launch an automated plastic production line and monitor its operation

Theme	**Knowledge**
1.Mounting the mould and preparing production on injection press	Various production documents and production orders
	Plastic processing machinery technology
	Mass injection manufacturing techniques of thermoplastic parts
	Risk areas on machinery and their security systems
	Production operations modes such as "auto", "semi-auto", "manual" and "setting"
	Characteristics of thermoplastic materials and their

	processing
	Mold technology and elements
	Overhead cranes and rules of use
	Energies, associated hazards, circuit types and energy connections
	Tool installation plans
	Hydraulic connection plans
	Different clamping techniques
	General technology of ancillary equipment such as color blender, vacuum pump, dryer, temperature controller
2.Starting, controlling, monitoring and shutting-down injection press production	Production documents and production orders
	Thermoplastic material characteristics and processing
	Serial manufacturing technique of injection thermoplastic parts
	Plastic Processing Machinery Technology
	Risk areas on machinery and their security systems
	Production operating modes such as "On", "setting"
	Reading parts plans
	Technology of the various common control instruments
	Connections between major defects and settings
	Machine control console
	Different manufacturing times
3.Launching production on an extrusion line	Extrusion products
	Various extrusion techniques
	Key extruded materials and implementation conditions
	Principle of single screw extruder: Architecture, set screw/barrel, behaviour of material in extruder
	Principle of the dual-screw extruder: Architecture, set screw/barrel, behaviour of material in the extruder
	Extrusion line functions: conformation, cooling, cutting and receiving
	Extrusion tools
	Extrusion line ancillary equipment
	Basic extrusion line settings
4.Production control and troubleshooting on an extrusion line **)N 2)**	Profile extrusion technology
	Principle of the single-screw extrusion machine
	Principle of dual-screw extrusion machine
	Extrusion line structure
	Defects encountered in extrusion
	Influence of setting parameters on an extrusion line
5.Using measuring and control devices	Technology of the various common control instruments
	Direct and indirect measurement methods
	Reading parts plans
	Various common defects in plastics processing
	Relationships between defects and changes in machine settings
	Basic statistical concepts

	Characteristics of a control card
	Calibration of control means
6.QHSE rules and instructions	Vocabulary, standards and organization of Quality
	Quality documents, different standards and product traceability
	HSE procedures, modus operandi and rules
	Personal protective equipment and its use
	Rules related to work gestures and postures
	Risk areas on machinery and their security systems
	Overhead cranes and rules of use
	Different power sources, associated hazards, circuit types and power connections
	Security systems and key components of the means of production
	Plastic processing machinery mechanisms technology
	The following technologies and their risks: automatic, electrical, mechanical, pneumatic, robotic and hydraulic
	Different power sources and their dangers
	Various electrical and mechanical clearances
7.Technical maintenance	Serial manufacturing techniques of thermoplastic parts such as extrusion, blowing extrusion, film extrusion, thermoforming
	Plastic Processing Machinery Technology
	Risk areas on machinery and their security systems
	Production operation modes such as "on", "setting"
	Connections between major defects and settings
	Machine control console
	Different production times

4.3.1.3 Organize production and optimize the manufacturing process on an automated line of plastic production

Theme	**Knowledge**
1. Production team leadership	Communication situations such as meeting, face-to-face, technical briefing, passing instructions
2. Mentoring	Key learning modes
	Workplace training methods
	Reception of documents and materials
	The term “Competence” or “Skill”
3. Problem solving and continuous improvement	Steps of a problem solving method
	Cost of production calculation elements
	Key production indicators
	Ergonomics and work organization
	Quality tools such as "Pareto", "Brainstorming", "WWWWW+H", "5M"
	Structure of an action plan
4. Elements of production management	Different manufacturing times
	Production management software and ERP
	Just-in-time methods

	Methods and tools for improving industrial performance such as "5S", "SMED", "Kaizen", "Lean"

The TPP professional certification was reviewed in 2018. Both new trade and assessment reference guides have been edited. This is the result of a regular examination of the evolution of the qualifications by the attached CPC. The above curriculum will be implemented at ISPA, starting September 2019 and will provide an opportunity to introduce innovative teaching techniques such as distance learning (the learner being physically in his/her company) and virtual classrooms.

CQPs (Certificat de Qualification Professionnelle) have also been implemented at ISPA for a long time. They aim specifically at workers, while the TPP aims to train unemployed persons. However it could also constitute an appropriate answer to the Upskill project.

4.4 BELGIUM

4.4.1. Plastic processing curriculum in BEFL

Education and training in Flanders for the plastics industry is conducted with the sectorial training fund PlastIQ. PlastIQ has two training centres, in Kortrijk and Genk. The Genk facility was launched in 2018 with state-of-the art processing equipment and 3D printing technology.

The training activities are divided into three pillars:

- Vocational training for employees;
- Vocational training for unemployed people with an aim to re-orienting them towards the plastics sector;
- Educational programs for schools, starting from elementary school up to high school. This also includes training material for teachers. This educational programme has a mobile showcase that can demonstrate plastic processing and mechanical recycling of plastics in different locations.

The table below gives an overview of the available programmes:

Program	**Name of a course**	**Hours**	**Degree**	**Qualification VKS=EQF**	**More info**
7th year of plastic processing techniques	7th year of plastic processing techniques	25 hours/week 3 hours/week in company	SenSe	Level 4	Link
Dual-learning Plastics@Tielt	5th year of mechanical design techniques	36 hours/week 4 hours/week in company	3rd degree TSO	Level 4	Link
Dual-learning Plastics@Tielt	6th year of mechanical design techniques	36 hours/week 8 hours/week in company	3rd degree TSO	Level 4	Link
Dual-learning	5th year of mechanical	36 hours/week	3rd degree TSO	Level 4	Link

	design techniques	min 14 hours/week in company			
Training for unemployed/ job seekers	KIEM	6-weeks training 4 weeks in company	-	-	Link

Below are some courses that are offered by PlastIQ:

Sector	Name of a course	Duration (days)
Plastic technology	A guide to plastic packaging	3
Plastic technology	Introduction to plastics and design	0.5
Plastic technology	Basic course in raw materials technology	1
Plastic technology	Practice-based basic course compounding	1
Plastic technology	Practically-oriented basic injection moulding course	2
Industrial training	Training to workplace coach	2
Plastic technology	Basic training profile extrusion	1
Plastic technology	Thermoforming	1
Plastic technology	Basic training in blown film extrusion	1
Plastic technology	Injection moulding for advanced users	3
Plastic technology	Basic injection moulding	2
Plastic technology	Get familiar with the basic analyses of plastics	1
Plastic technology	Basic molds and dies	1
Plastic technology	Thermoforming - vacuum forming	1
Plastic technology	Welding with plastics	1
Plastic technology	Basic injection moulding	3

There are 5 different programmes that are offered to dual learning students, seventh graders or unemployed. All programs have in-house classes and practical work inside companies. The courses cover basic understanding of plastics and usual operations connected to the plastics industry.

4.4.2. Plastic processing curriculum in BEFR and Brussels region

In the Wallon region and Brussels area, there is a similar educational mobile tool called Plastimobile. Plastimobile is a mobile workshop that recycles plastics to create new plastic objects. It is an educational tool on plastics recycling as well as a teaching device on science, technology and chemistry.

4.5 CONCLUSIONS

The differences between educational systems can be seen here, too. However, the common strategy in VET development seems to be similar in all the countries i.e. the development of the content has been carried out based on a long tradition of co-operation between schools and industry. The main objective, which can be observed in all the programs, is to offer an appropriate response to the industry needs in qualifications and its evolution. In general, a large part of the training is dedicated to practical activities (ex: 70% in the Lithuanian program).

One can notice also a big diversity in the training curricula offered by the Upskill project partners. For example, although the contents of the programs are quite similar from one partner to the other, in Lithuania only one training program is available whereas in France at least three existing programs respond more or less to the Upskill objectives (TPP, Bac Professionnel en plasturgie, CQPs).

All programs are already competence oriented. Finland, for example, has set a system articulated around competence unit and competence point (with compulsory et optional units) while in France “Type-Activities” divided in “competences” constitute the basis of the TPP training and assessment system.

Last point is the common objective to elaborate a single training program dedicated to different beneficiaries, particularly employees, unemployed persons, apprentices and students.

All these elements give a very favourable ground for the construction of common curriculum with the elaboration of teacher and student manuals as the Upskill project aims.

5 SURVEYS OF PLASTIC INJECTION MOULDING COMPANIES

The same 6 questions were prepared for a survey of plastic injection moulding companies in Lithuania, Finland, France and Belgium:

- What percentage of the company's employees is directly working with the plastics processing technologies and has a corresponding qualification?
- Would you encourage company employees to study/improve their qualification under the plastic processing VET curriculum? Why?
- What technologies used in the processing of plastics should be included in the plastic processing VET curriculum?
- What kind of practical competencies should be included into the new curriculum of plastic processing?
- What could be the optimal duration (hours/credits) of the new curriculum of plastic processing?
- Would you apply for apprenticeship in accordance with the new curriculum of plastic processing? Why?

5.1 LITHUANIA

5 companies were interviewed by LINPRA: Terekas, Putokšnis, HODA, Frilux and Intersurgical.

- What percentage of the company's employees is directly working with the plastics processing technologies and has a corresponding qualification?

The answers regarding this question differed. Putokšnis indicated the highest result - 65 percent of their employees directly working with plastic processing have adequate qualifications, while the rest of the companies presented worse results. Terekas said that only 2 out of 12 plastic moulding machine operators and supervisors have attended injection molding courses. All the other employees including bottle blow-molders were fully trained in the company. Hoda could not provide exact numbers but according to them, basically none of the employees had training concerning the technology of plastics. Frilux said that only 10 percent of their employees have the adequate education, as there is no specialized qualification, at best there are professions in the fields of mechanics and automotive mechanics. Intersurgical named 16 percent.

The conclusion can be made that surveyed Lithuanian companies do not have enough employees working in plastic processing area with corresponding qualifications.

- Would you encourage company employees to study/improve their qualification under the plastic processing VET curriculum? Why?

All of the surveyed companies unanimously agreed that they would encourage their employees to improve their qualifications under the new VET curriculum. Putokšnis added that the employee could come to the company already having theoretical knowledge, and the company could provide practical training/experience to connect everything together. HODA mentioned that this would be very helpful and important as this is one of the most important competencies in their company. Frilux would definitely motivate people to deepen their knowledge in the area of plastics processing

because the current qualifications of employees are limited. Intersurgical would also encourage employees to train/upgrade their qualifications studying at the plastic processing VET programme because the products they produce are made of plastic. So, employees with the knowledge of plastic processing would be able to carry out their work competently and efficiently, and they as an enterprise would not have to put a lot of effort into initiating employees in the technological processes of plastics processing.

Consequently, it can be concluded that a new and innovative VET curriculum is highly important and would bring a lot of benefits for the plastics processing companies and their employees. The current situation regarding employees' qualifications is not satisfactory and needs to be improved in Lithuania.

- What technologies used in the processing of plastics should be included in the plastic processing VET curriculum?

All of the companies distinguished injection moulding as the priority. Terekas also mentioned PET blowing, as well as equipment maintenance, alignment, information on raw materials, applications, process inconsistencies (breakages, deviations) and how to avoid them, ancillary equipment and usage, process optimization options, cycle time, factors that affect main recycling and recycling of raw materials. Putokšnis has also added preparation of raw plastic materials and crystallization.

HODA would split injection moulding technology into the following sub-technologies:

- over moulding of plastics or metal parts;
- casting by injection of gas assisted injection moulding (GAI);
- multi component injection moulding;
- thermoset injection moulding;
- structure of casting moulds, key elements, maintenance, etc.

In addition to molding technology, HODA sees the need to grow competencies in robotics programming due to the increasing number and use of robots in industry. Equipment maintenance training should also be included to make the curriculum full and logical. In addition, HODA recommended including blow-moulding and extrusion in the programme. Frilux named injection moulding, double moulding, mold construction, plastic material and their properties. Intersurgical gave the view that the new VET programme for plastics processing technologies should include the following technologies: injection moulding machines and their structure structure - main parts involved in component injection moulding, casting injection moulding, casting injection moulding setting parameters - pressure, speed, clamping force, safety during injection moulding, the specifics of plastic materials, the necessary parameters for evaluation during injection moulding, quality control, defects that may occur during injection moulding, their causes.

This question revealed that companies have very concrete suggestions for the new VET programme curriculum and are willing to share them. The priorities to be included in the curriculum are injection molding, raw materials and blow molding. Robotics mentioned by one company also demonstrates preparation for future changes and the ways of companies to deal with them.

- What kind of practical competencies should be included into the new curriculum of plastic processing?

Terekas have mentioned minimal chemical knowledge, technical knowledge related to maintenance and operation of equipment, computer literacy, knowledge of production standards (ISO, BRC,

GMP), responsibility and approach to work, improvement of your workplace. Putokšnis indicated openness to change, communication, learning, development, taking initiatives. Frilux distinguished 3 parts of competencies:

- Knowledge of materials - the difference between plastics, their properties, nano-micro accessories, and also recyclability, temperature, physical differences. Such specialists are currently non-existent in Lithuania.
- Knowledge of moulding - how the mold is built and produced, what kind of mistakes are made, how the process takes place, etc. plus mold engineering.
- Knowledge of the machine and process adjustment : according to Frilux, it appears that there are mainly "one shot" specialists at the moment who are familiar with 2 components at the most. If 3-4 components are needed, (silicones, overflow, welding after overmolding, etc.), or if ancillary equipment needs to be connected up , again such specialised knowledge does not exist in Lithuania.

Intersurgical named basics of mathematics and arithmetic- the ability to make elementary calculations during the training. In addition, there is a need to teach communication in Lithuanian language and if possible foreign language training in order to be able to communicate and understand the basic principles of learning during training. Technical expertise is necessary as an additional subject competence.

To conclude, the companies see the need to teach not only technical subjects, but also basics, soft skills and languages. There is a wish to have versatile and competent specialists in the workplace.

- What could be the optimal duration (hours/credits) of the new curriculum of plastic processing?

The answers have differed. 2 companies indicated that the best duration would be from 6 months to 1 year. Intersurgical recommended having a 2-year VET programme. Terekas mentioned a 3-4 week programme and provided more explicit explanation: "Week 1 - Theory; Week 2 - 2 days dedicated to theory, 2 days to practice, 1 - for discussion of results; Week 3 - 2 days dedicated to theory, 1 day - for suggestions, 2 days for manufacturing of implementation suggestions". Everything should end with the examinations and discussions of theory and practice.

A conclusion can be made that the suggestions of programme duration are very different but the average is 1 year.

- Would you apply for apprenticeship in accordance with the new curriculum of plastic processing? Why?

All of the companies unanimously agreed that they would apply for apprenticeships with the new curriculum. Putokšnis added that this would provide more assurance that the employee would have the experience of working for the company. HODA also emphasized the need to train their employees. Frilux mentioned that they already participate in apprenticeships. Intersurgical would carry out apprenticeships under preparation of a VET programme, as all the conditions for both theoretical and practical learning are created in their company.

To conclude, companies see apprenticeship as an important part of their working day life.

5.2 FINLAND

In this study, 12 companies were interviewed by the Finnish Plastics Industry Federation. The interviews were carried out by sending companies the questionnaire and drawing the answers together by the researcher.

- What percentage of the company's employees is directly working with the plastics processing technologies and has a corresponding qualification?

The percentage of employees working directly with the plastics processing varied from 5% to 40 % , the typical value being 30 %.

- Would you encourage company employees to study/improve their qualification under the plastic processing VET curriculum? Why?

All the companies interviewed stated that it is beneficial for the company to educate personnel continuously. Training clearly enhances quality in production and increases employees' motivation. Lack of suitable courses was the main reason why companies did not use VET to train and educate their employees. Some companies find that internal training is enough, but the majority mentioned that they would benefit from VET level courses.

- What technologies used in the processing of plastics should be included in the plastic processing VET curriculum?

The processing technologies most mentioned in the answers were injection molding and extrusion. Sheet extrusion and thermoforming were also mentioned.

- What kind of practical competencies should be included into the new curriculum of plastic processing?

Practical competences that should be included in the plastics processing curriculum which is being developed were : knowledge of plastic raw materials, processing and the processing technology used. The idea of an industrial mind-set was underlined. Processing technology knowledge and skills needed would include : understanding effects of temperatures, pressures, gases and raw materials on the quality. Maintenance and running of the machine, solving quality problems were also mentioned as areas that would benefit from education. The competence list continued with ITC, automation, robotics, process control, polymer chemistry.

Experiential learning was the companies' response on how to increase knowledge and promote careers. One challenge would appear that it is difficult to devise training for people employed in different companies because everyone has different machinery.

- What could be the optimal duration (hours/credits) of the new curriculum of plastic processing?

It seemed to be difficult for the companies to define the optimal duration for the training needed. One-week intensive courses were mentioned to be useful. Depending on their background, employees could benefit from courses lasting 200 hours after which another 200 hours of in-depth studies could be a good package.

- Would you apply for apprenticeship in accordance with the new curriculum of plastic processing? Why?

Most of the companies in this study found the apprenticeship a good way to train plastics processing technology professionals. One of them did not have any experience of apprenticeship and the majority did not comment on this issue.

5.3 FRANCE

The results below were discussed in a committee of the Federation de la Plasturgie et des Composites with several companies: Plastic Omnium, Aptar, Albéa, RBL Plastiques, Wavin, Plasti Ouest, Allizé Plasturgie.

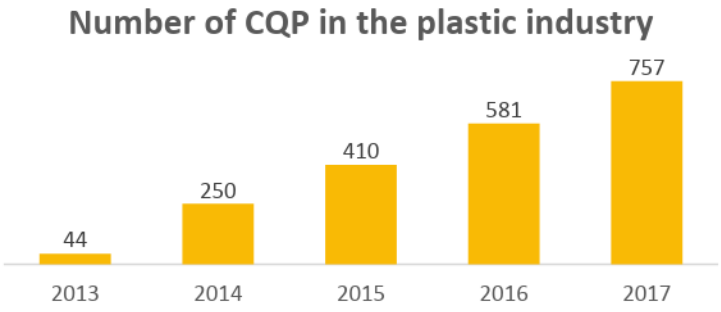
- What percentage of the company's employees is directly working with the plastics processing technologies and has a corresponding qualification?

This is a difficult answer for companies in France. Most of the employees (about 70%) enter the plastics industry with no qualifications for our occupations, as initial training does not provide enough qualified students each year to fit the plastic industry needs. Most of these employees have a qualification for other occupations, but being unable to find a job related to their qualification finally chose the plastics industry.

However, as there is an obligation to train employees in France, almost all employees working directly with the plastics processing technologies have a corresponding qualification after several years of experience.

- Would you encourage company employees to study/improve their qualification under the plastic processing VET curriculum? Why?

In France, there exists a strong encouragement to improve their qualifications under the plastic processing VET curriculum, organised around CQP (Professional Qualification Certificate). These are professionally-designed certifications, and it helps employees either to improve or keep their professional skills up-to-date. The plastic processing professional branch's CQP were re-engineered in 2013 to fit better the skill needs of industrial companies. Their development has been very strong for the last 4 years:



1 of 8 companies of France's Plastic processing industry already used the CQP at least once and 60% of them used it again after their first experience. 66% of employees who have obtained a CQP since 2013 had a qualification level lower than baccalaureate, and 30% had no qualifications at all prior to their CQP. In 2017, the average age of employees who got their CQP was 41 years old. 47% of them had more than 10 years' experience in their company, and 11% had less than 2 years' experience in the plastic processing industry.

- What technologies used in the processing of plastics should be included in the plastic processing VET curriculum?

Most of the VET training curricula in France are dedicated either to injection processing or extrusion. These are the priorities for French companies. However some of them also expect other technology-based curricula: thermoforming; rotational molding; extrusion blow molding; composite materials.

- What kind of practical competencies should be included into the new curriculum of plastic processing?

Regarding the fact that Upskill Project is designed for processing operators, the main skills should cover those included in the "Baccalaureat Professionnel Plastique et Composites", the "Plastics Production Technician" (TPP) professional certification, accredited by the French Ministry of Industry, and the "CQP Conducteur d'Equipement de Fabrication", which all fit the skill needs in France. However, some behavioural skills and languages (English) could be an interesting complement of skills for future employees.

- What could be the optimal duration (hours/credits) of the new curriculum of plastic processing?

It seems hard for companies to express a relevant duration. However, they prefer short duration and operational training (like CQP, generally under 250 hours, depending on the existing skills of the trainee) to long-term training like Bac Pro (3 years). The credit system is not widely used in France, and companies cannot express any relevant value of credits for Upskill Project.

- Would you apply for apprenticeship in accordance with the new curriculum of plastic processing? Why?

Apprenticeship is the most valued *modus operandi* to train employees for plastic processing skills, because trainees already have experience and become more easily autonomous in their job. Students and employees trained in an apprenticeship model are the most desired in professional recruitment. However, apprenticeship suffers from a poor image in France amongst the general public, and has difficulties in attracting students, so recruiting an apprentice appears to be quite competitive between companies. For that reason, the French State and the professional branches are now engaging important means to promote apprenticeship throughout the national education system. For the record, the last reform (2018, September 4th) has a strong objective to change the poor image of apprenticeship in France.

For these reasons, apprenticeship should be applied to the new curriculum developed through Upskill Project.

5.4 BELGIUM

Below are the results from the survey (Incoplas, Belgium):

- What percentage of the company's employees is directly working with the plastics processing technologies and has a corresponding qualification?

Approximately, 50% of their employees (+/- 60 FTE) are directly working on the machines. However, there are different professions based on the qualifications, such as: setters, technicians, operators, and research & development employees.

Setters are the most skilled persons in changing moulds and changing the "set of parameters" on the machine, with a focus on the process. They have a technical background (A2 profile - mostly level below the bachelor), and have received on-the-job training , and also draw from experience.

Technicians are specialised in mechanical / electrical movements of the machines, and they understand the specific needs for these machines in blow moulding. Their knowledge and experience are beyond the standard pneumatic / hydraulic knowledge of machinery. Their educational background is based from electro or mechanical engineering school (also the A2 profile), and due to the generic technical approach, it is mostly individual skill based.

Operators make up the largest group, and are directly engaged with machines. They keep the machines running and are take care of the quality, continuity and stability of the processes. They have an interest in machinery and broad technical understanding. They are expected to work on machines with a set of tools ("the first mechanic interventions"), and receive on-the-job training via colleagues and mentorship.

Research & development employees have a wide background on plastics engineering, combined with understanding of plastics. They have an University degree in Engineering and/or Plastic Manufacturing.

- Would you encourage company employees to study/improve their qualification under the plastic processing VET curriculum? Why?

They are encouraging their employees to improve their qualifications. The company wants to strengthen the individual skills on handling the processes and machinery. In addition, they would like to partially standardize training and lever the internal assistance , with an aim to creating more stable processes, and raising employee personnel satisfaction.

- What technologies used in the processing of plastics should be included in the plastic processing VET curriculum?

Incoplas suggested the following: generic training regarding plastics production; the different types of plastic materials; specific training on the process of extrusion blow moulding; in-depth study of every piece of the equipment; understanding the movements of the machines e.g. clamp force / cutting process; characteristics for plastics: melt flow, colour percentages, etc.; setting the parameters, including an impact on the product (bottle) when changing the parameters.

- What kind of practical competencies should be included into the new curriculum of plastic processing?

The company suggested making it modular, enabling them to select items that bring added value. The practical part should require the usage of machines, and the students need to understand the necessity for specifications and have an ability to measure with the tools and equipment. They should be able to learn to work with basic machinery, including changing weights, adjusting temperatures and changing moulds / die.

- What could be the optimal duration (hours/credits) of the new curriculum of plastic processing?

It depends on the content of the curriculum.

- Would you apply for apprenticeship in accordance with the new curriculum of plastic processing? Why?

It depends on the content of the curriculum. They would not be open to sending employees to a competitor company.

5.5 CONCLUSIONS

It can be concluded that the new VET curriculum is important and necessary to all countries participating in the UPSKILL project. All of the companies which have been surveyed stated that there are not enough specialists working in the plastic industry and having corresponding qualifications - in all cases the percentage of employees having the right qualification was less than 65 percent, usually 20-30 percent. All of the companies unanimously agreed that they would encourage their employees to deepen their knowledge and improve qualifications under the new innovative VET programme. When asked about the technologies used in plastic processing, companies suggested many subjects to be included into the curriculum - all of them have mentioned injection moulding, raw materials, blow molding and extrusion among the most important. From the answers it is clearly seen that the companies know exactly what they need and are willing to share it in order to reach a purpose so that all parties (education institutions, business companies and students) would be satisfied. Among other subjects they have mentioned robotics, sheet extrusion, thermoforming, plastics production, movements of machines, rotational moulding, etc. Talking about practical competences to be used, companies see the need to not only teach technical aspects but also concentrate on soft skills (behavioural skills, communication, responsibility and approach to work, openness to change, taking initiatives, etc.), plus basic knowledge of chemistry, mathematics, and languages - both, national and English. As regards the duration of the programme, it seemed difficult for the companies to express relevant duration - the answers varied between 2 weeks and 3 years, the average being 1 year. Finally, with regard to apprenticeship, all agreed that this form of teaching has a poor image in today's society but came to the conclusion that it is the most valued way of teaching and they would all apply for apprenticeships in accordance to the new curriculum for plastic processing since apprenticeship-trained students and employees trained are most sought after in professional recruitment.

6 CRITERIA AND RECOMMENDATIONS FOR DEVELOPING A MODEL QS AND MODEL VET PROGRAMME

The project partners have analysed existing training programmes on the plastic machine operators, its profession-specific skills needs and identified that development of green and digital skills are specific industrial requirements.

EQF-BASED VET CURRICULUM, with a strong presence of technical and practical skills in order to accommodate contents to the new digital era, will include the following modules, among others:

- Basic skills on manufacturing of plastic products;
- Job-specific skills on injection moulding/ blow moulding/ pipe and profile extrusion/ thermoforming/ manufacturing of composite plastic/ manufacturing of rubber compounds;
- Programming and digital skills;
- Robotics;
- Green skills (key elements of the Circular Economy, policy issues, life-cycle thinking, theoretical and practice approaches to implementing changes, renewable energies and energy efficiency, environmental impact and energy costs of business activity, respect for nature, shared responsibility, etc.);
- Lean manufacturing (tools and processes to eliminate waste from the plastics manufacturing process resulting in improved efficiency, effectiveness, and profitability);
- Entrepreneurial skills (interpersonal skills, motivation, communication, teamwork, adaptability, planning, problem solving etc.);
- Health and safety at work.

The work of this project will continue as WP2, in which a common curriculum is designed for VET level European plastic product processing workers. The table below gives recommendations that give a good basis for further development process.

Competences	**Learning outcomes illustrating the achievement of competences**
BASIC SKILLS OF PLASTIC PRODUCTS MANUFACTURING	
Performing general plastic processing skills	These basic plastics processing skills are mandatory: 1. To know the types of materials and their physical and chemical properties, that may be used in the polymer processing; 2. To have knowledge about hydraulics, pneumatical and mechanical processes occurring in polymer processing; 3. To have knowledge about main reasons for defects of plastic parts produced by polymer processing and to know how to fix them by changing equipment parameters 4. To know the types of machines and equipment which may be used in the polymer processing, maintenance; 5. To have good logical thinking, *because polymer processing is a complex process that to produce a quality produc*t; 6. Pressurization and pumping; moving and transporting the melt to the shaping operation.
JOB-SPECIFIC SKILLS ON INJECTION MOULDING/ BLOW MOULDING/ PIPE AND PROFILE EXTRUSION/ THERMOFORMING/ MANUFACTURING OF COMPOSITE PLASTIC/ MANUFACTURING OF RUBBER COMPOUNDS	
Performing general tasks of plastic	*Injection molding knowledge*

processing operator according to the listed processing technologies	1. To know the types of materials and their physical and chemical properties, that may be used in the injection molding process; 2. To know the types and have ability to control the main injection moulding process: Plasticisation (transformation of thermoplastic powder or granules into a homogeneous melt state); Injection (transfer of melted plastic from the plasticisation unit to all parts of the mould cavity); Cooling (plastic cooling and solidifying into the shape of the desired part); Ejection (Opening of the mold and removal of molded parts); 3. To know injection molding machine and injection molds main units and components.
	Thermoforming: 1. To know the types of materials and their physical and chemical properties, that may be used in the thermoforming process; 2. To know the types of forming (Vacuum, pressure and mechanical forming) and have the ability to control the main thermoforming process: Heating (thermoplastic sheet heating to its softening point); Stretching or Pressing (the sheet is held horizontally over a mold and pressed into or stretched over the mold); Cooling and Machining; 3. To know the thermoforming machine and thermoforming molds main units and components.
	Blow molding: 1. To know the types of materials and their physical and chemical properties that may be used in the blow molding process; 2. To know the types of blow molding (extrusion, injection and stretch blow molding) and have the ability to control the main blow moulding process: Parison preparation (thermoplastic tube production by extrusion or injection molding process), Insertion of a blowing stick, Inflation (thermoplastic tube heated to its softening point and blown up by compressed air in a mold), Cooling and Ejection; 3. To know blow molding equipment and mold main units and components.
	Extrusion: 1. To know the types of materials and their physical and chemical properties, that may be used in the sheets or tubes extrusion process; 2. To know the types of extrusion (sheet, pipes, profiles) and have the ability to control the main extrusion process: Plasticisation (transformation of thermoplastic granules into a homogeneous melt state), Extrusion (melted plastic flowing through the dies), Cooling unit with conveyor and Cutting; 3. To know extrusion equipment and die main units and components.
PROGRAMMING AND DIGITAL SKILLS	
Performing general plastic injection molding operator occupation tasks	To know how to control the following injection machine parameters via the display screen: 1. Melted plastic injection speed; 2. Reciprocating screw rotation speed; 3. Over pressure;

	4. Barrel working zone temperature; 5. Injection mold cooling temperature; 6. Part ejection speed and ejectors working length; 7. Identify a correct weight of melted plastic for produce part; 8. Hot runners programming. 9. Masterbatch dosing unit programing.
ROBOTICS	
Performing general plastic injection molding operator occupation tasks	To know how to control these injection machine parameters via a display screen: 1. Plastic chemical and physical parameters; 2. Masterbatch dosing differences by volumetric and weighty; 3. Injection mold and injection machine cleaning; 4. To switch on and set the injection machine and connect cooling pipes; 5. To know how to control lifting crane and have safety certification; 6. To know injection machine structure and specifications; 7. To know injection mold structure; 8. To have knowledge about hydraulic and pneumatic process; 9. To have knowledge about all possible defects of plastic parts in molding process and to know how to fix them by changing injection parameters.
GREEN SKILLS (KEY ELEMENTS OF THE CIRCULAR ECONOMY, POLICY ISSUES, LIFE-CYCLE THINKING, THEORETICAL AND PRACTICE APPROACHES TO IMPLEMENTING CHANGES, RENEWABLE ENERGIES AND ENERGY EFFICIENCY, ENVIRONMENTAL IMPACT AND ENERGY COSTS OF BUSINESS ACTIVITY, RESPECT FOR NATURE, SHARED RESPONSIBILITY, ETC.)	
Identifying companies that want to integrate circular economy concepts (5 steps)	1. To know the main elements of the circular economy. 2. To explain why the circular economy can be useful.
Creating product life-cycles	Know product recycling possibilities
Knowing how to develop and implement sustainable product and service ideas	Acquire proficient sustainability skills (economical, social and environmentally sustainable products and services)
LEAN MANUFACTURING	
Applying the principles of quality management systems	1. Evaluate LEAN production efficiency improvement methodology; 2. Evaluate the methodology for increasing the efficiency of TOC production; 3. Evaluate SIX SIGMA production efficiency improvement methodology; 4. Diagnose production company problems and choose the right tool to increase production efficiency.
Evaluating production efficiency, profitability indicators	Evaluate production cost and actual production costs, analyse other financial ratios at the moment
Performing general tasks of the plastic processing operator according to the principles of Lean applied to the above-mentioned plastic processing technologies	1. Automatization of raw material supplying to polymer processing machine; 2. Robotization of produced parts removing and transportation from polymer processing machine; 3. Recycling of plastics and using secondary raw material in production; 4. New technology installation into existing lines or machine

	(laser cutting for plastics, more efficient cooling systems, improved mechanical processing machine); 5. All production rates should be visible to all workers separately; 6. Analysis of installed new technologies and publication of results in short meetings.
ENTREPRENEURIAL SKILLS	
Explaining the areas of business creation, organization, specifics and legal regulation, evaluating differences and understanding the importance of theory for practical business organization	1. Evaluate the external and internal business environment; 2. Compare and evaluate different forms of business organization, distinguishing their advantages and disadvantages; 3. Describe and calculate business paid taxes.
Responding to questions, illustrating and interpreting them in an unusual way, developing creative thinking, offering innovative ways to solve problems, to communicate and collaborate	1. Reveal the entrepreneurial skills and abilities of the group and its members; 2. Identify the differences between entrepreneurial and managerial skills, explain the basic skills needed by the entrepreneur: leadership, communication, motivation, and developing them in practice; 3. Evaluate and validate new business ideas.
Becoming at your own level, an actor in your company's development	1. Adopt an active posture in the company in order to contribute to its development; 2. Develop a strong sense of curiosity which will bring opportunities to improve the manufacturing processes and the organization; 3. Become a teamwork facilitator; 4. Show proactivity to bring a solid contribution to innovative projects; 5. Become a source of proposals in the company; 6. Have the ability to become project leader at your own level of responsibility.
Getting to know yourself, your way of life and career, developing the attitude to continual improvement, to achieve goals	Prepare a career portfolio
HEALTH AND SAFETY AT WORK	
Performing plastic product manufacturing safely (internal need for safe working)	1. Assess the workplace conditions of the plastic manufacturer in terms of existing or potential hazards and risk factors. 2.Identify and characterize the impact of risk factors on the safety and health of the worker and on working capacity. 3.Describe occupational risk factors: physical, physical, chemical, ergonomic, psychosocial, biological. 4.Describe the causes of occupational diseases and their investigation process.
Assessing the conditions of the workplace and the state of the work environment in terms of existing and potential occupational risk factors, applying protective measures against their effects	Proper selection and targeted usage of collective and personal protection measures against the risk factors.

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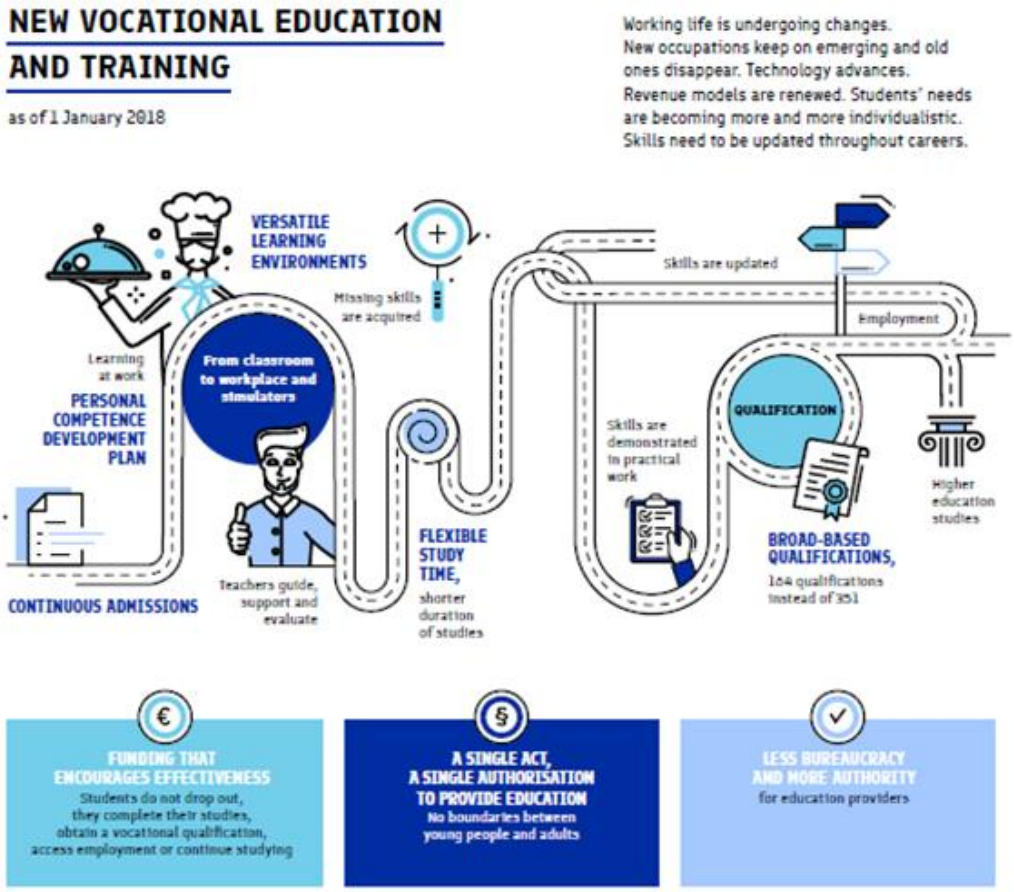
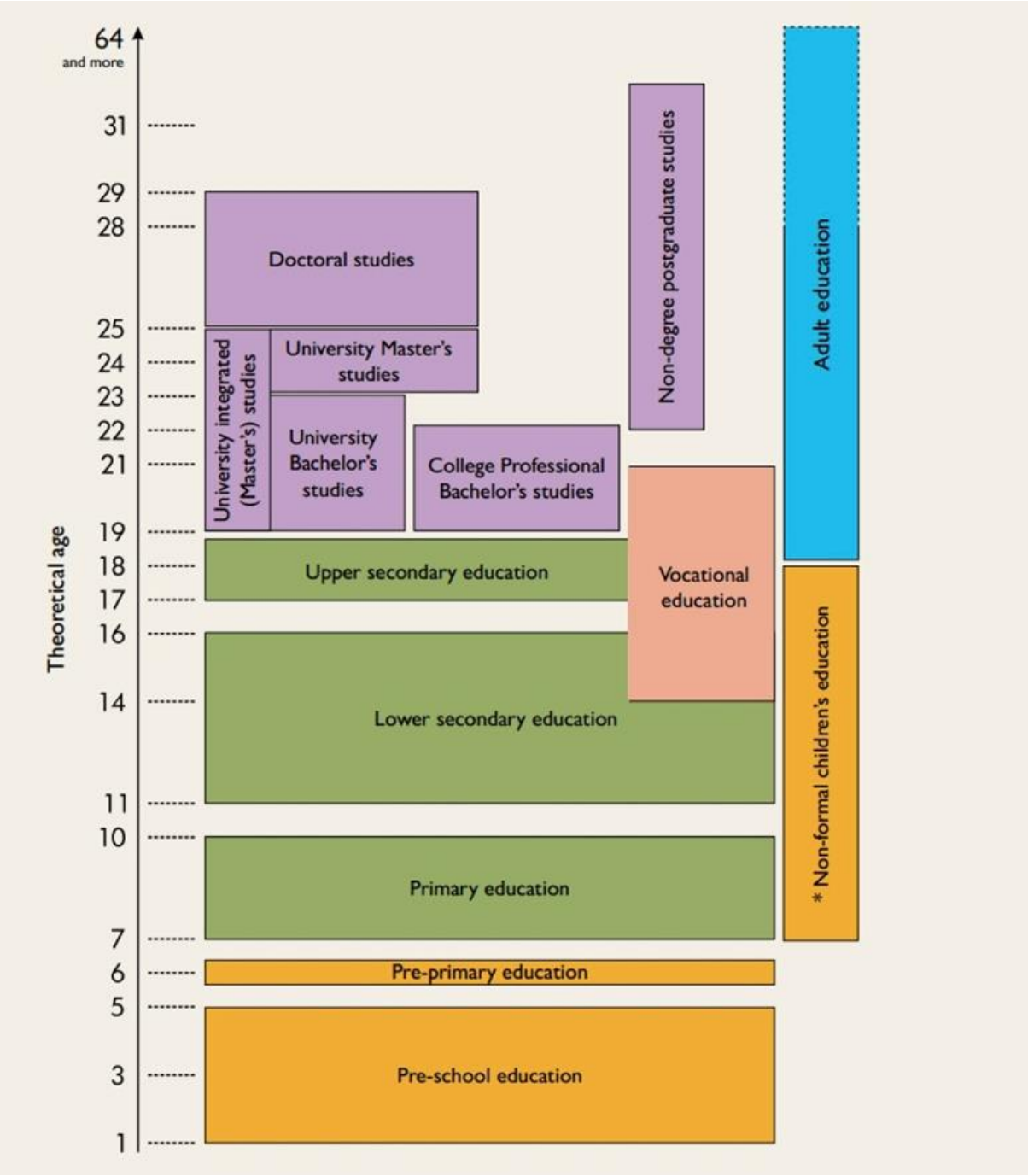
ANNEXES

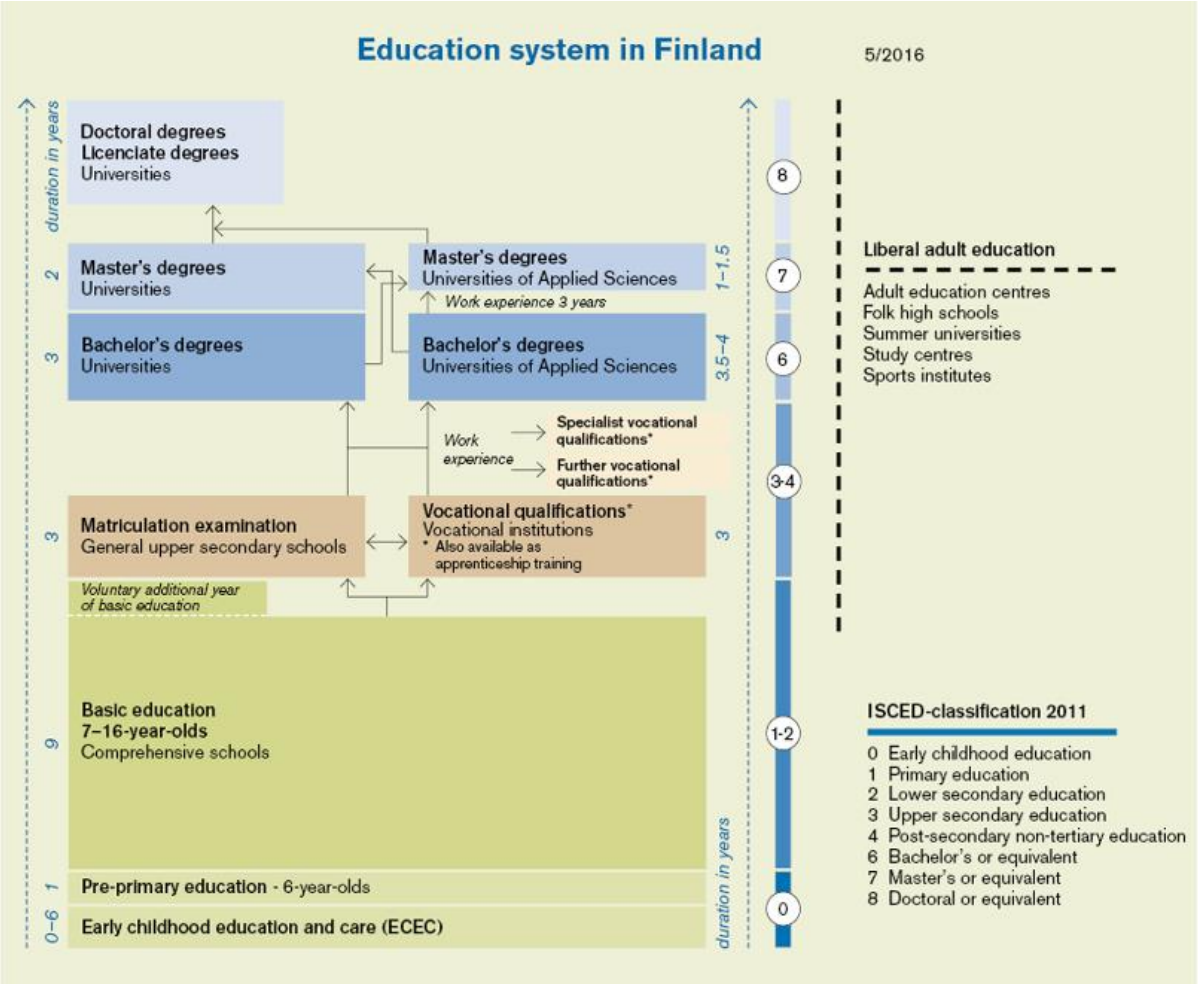
Annex 1. The Finnish VET Education system demonstrating the versatility and flexibility of the education system



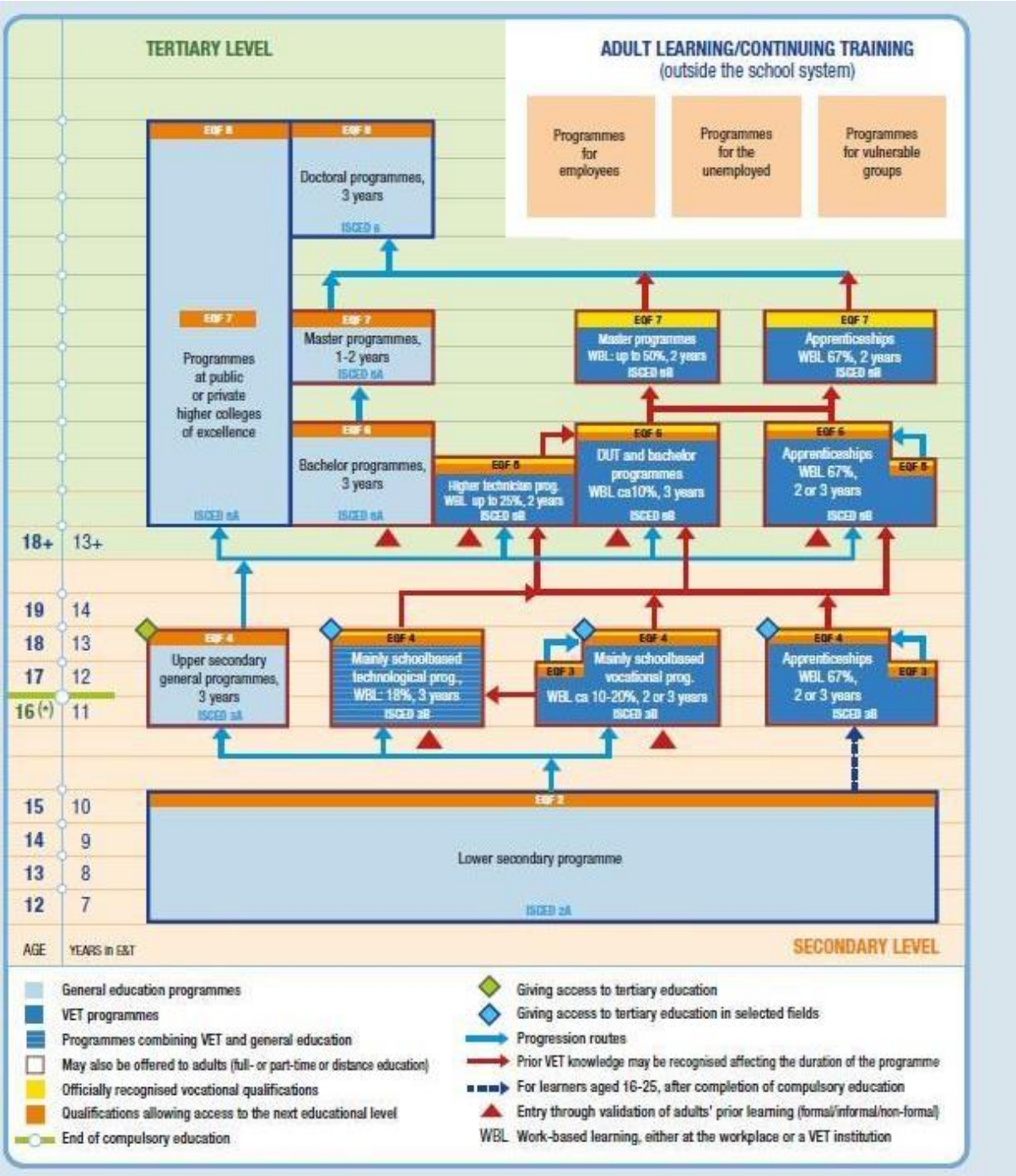
Annex 2. The Education system in Lithuania



Annex 3.The Education system in Finland



Annex 4. The National Education and training system in France



Annex 5. The schematics of the Belgian Education and training systems and a position of VET