Integrating Companies in a Sustainable Apprenticeship System

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Intellectual Output 6

Comparative Report

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1. Introduction

Aim of IO 6 of ICSAS project is to develop, validate and publish a Sector Qualification Framework (SQF, levels 2-4) for initial qualifications of industrial shoe production and to integrate all qualifications on these levels of our sector from Portugal (PT), Spain (ES), Romania (RO) and Germany (DE) into this SQF.

Our first step was to explore an overview of what happened in the development of National Qualification Frameworks (NQF) in these four countries, how these NQFs are linked to the European QF (EQF) and what qualifications of our sector are of relevance for this aim. Thus four separate national reports were produced; here the comparative report from these is presented. This report is available not only in English, but also in our four languages.

The comparative report is subdivided into five chapters; the first one of this report describes briefly the history and the implementation of a qualification framework (QF) in partner countries and their linkage to EQF.

All non-sector related Qualification Frameworks refer to broad and open descriptors like “A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study” (EQF, level 4, skills, EU 2008, updated EU 2017). A SQF offers the option to specify this broad “field of work”; our joint transnational decision on this were the nine relevant spheres of activity within the sector of industrial shoe production, already mentioned in IO1 reports. These spheres of activity are described in more detail in chapter 3.

Fourth chapter sketches briefly the relevant qualifications from industrial shoe production in Germany, Portugal, Romania and Spain on Initial Vocational and Training (IVET) levels (<=4).

Finally, fifth chapter consists of our Sector Qualification Framework, levels 2-4, for industrial shoe production. The framework is presented in tables to facilitate the transnational comparison and to offer a comprehensive visualisation thereof.

This comparative report is a collaborative report; parts taken from the national reports are not marked as citations.

2. Main issues of the Qualification Frameworks in partner countries

On 23rd April 2008, Recommendation 2008/C111/01/EC of the European Parliament and of the Council on the creation of the European Qualifications Framework for Lifelong Learning was approved (EU 2008). The objective of this Recommendation was to create a common frame of reference that would serve as a conversion mechanism for the different national systems and qualification levels for general and university education and for vocational education and training. The Recommendation aimed to improve the transparency, comparability and portability of qualifications.

From this date, European countries such as Germany, Spain, Romania and Portugal started developing their own national qualification frameworks to promote greater mobility for citizens in their learning, training and work environment, fulfil the commitment derived from the EU 2030 Agenda and its objectives, and guarantee an inclusive, equitable and quality education, as well as promoting lifelong learning.

2.1. Germany

Differing from Anglo-Saxon countries, Germany has no tradition with qualification frameworks. Discussions on this started in the late 2000 years; initiated by the development of the European Qualification Framework (EQF) that was published in 2008.

First step was to develop and approve the DQR, which took place from 2006-2009 (AK DQR 2011, p.2-4). Delegates from all relevant institutions (national and federal ministries, social partners, chambers, universities, General Education, Vocational Education and Training, Higher Education, Adult Education, and others) developed the following structure differing from EQF, which divides between 3 abilities (knowledge, skills and competences):

DQR	Professional competence		Personal competence	
	Knowledge	*Skills*	*Social competence*	*Autonomy*

Table 1: Differences in descriptors between EQF and DQR

Second step was the referencing of all qualifications of four pilot sectors (metal/electro, health, information technologies (IT), and trade) to DQR until 2012 (Sperle 2012, p. 8). At the end of this period, a political decision took place, again: all VET qualifications that last 2 years are on level 3; all VET qualifications that last 3 or 3.5 years are on level 4. Main challenging discussion during this period was whether “Abitur” (university entrance certificate) should be below/on the same level/or above 3 year VET qualifications. 5 years later, in 2017, “Abitur” was levelled on level 4.

Third step, formal referencing of DQR to EQF took place in 2012; a qualification on level X of DQR is on the same level X of EQF (DQR 2013, p.11).

The scope of the ICSAS project is Initial Vocational Education and Training (IVET). These qualifications were referenced in Germany to levels 3 and 4. In a narrow sense, the German context of the word "qualification" encompasses qualifications offering access to qualified work and/or increasing opportunities on labour market. Other certificates or measures that offer access to educational tracks or increase chances to get an apprenticeship were originally not foreseen in the DQR, but the "entry training" was included in 2014 (DQR 2014, chapter 3).

2.2. Spain

The Spanish Government entrusted the preparation of the Spanish Qualification Framework for Lifelong Learning (MECU) to the Ministry of Education in 2009, following the Recommendation 2008/C111/01/EC and the Spanish Sustainable Economy Law. This process, coordinated by the General Directorate of Vocational Training, gathered the Ministries of Employment, Industry, and Economy, as well as other social actors (institutional entities, training evaluation agencies, etc.) and took place from 2009-2019. Although it should be mentioned that the MECU has not come into force yet since its draft Royal Decree still has not been published on the Official Spanish Gazette (BOE).

The Spanish Framework for Lifelong Learning (MECU) is linked to the EQF and together with the Spanish Qualifications Framework for Higher Education (MECES), completes the eight reference levels of the European framework.

Each level is associated with learning outcomes descriptors, classified in knowledge, skills and autonomy and responsibility, in accordance with the EQF, but adapted to the national context.

Since the scope of the ICSAS project is Initial Vocational Education and Training (IVET), in Spain this includes levels 2-4.

- Level 2 includes the official certificate of completion of the second year of compulsory secondary education and the certificate of vocational training programs for students with special educational needs or specific groups.
- Level 3 has two sublevels, depending on the academic or professional values, or both, as well as the breadth of the qualification:
    - Level 3 A includes the Secondary Education certificate and/or the certificate of Basic Professional Technician;
    - Level 3 B includes level 1 Professional Certifications.
- Level 4 has three sublevels, depending on the academic or professional values, or both, as well as the breadth of the qualification:
    - Level 4 A includes the qualifications of Upper Secondary Education, Professional Training Technician, Professional Music Teaching Technician, Professional Dance Teaching Technician, Plastic Arts and Design Technician and Sports Technician;
    - Level 4 B includes level 2 Professional Certifications;
    - Level 4 C includes the Vocational Training Specialisation courses.

2.3. Romania

Romania, with support from the European Union, started since 1994-95 an extensive reform of the national vocational education and training system (VET) by developing a National Qualifications Framework. In 2011, Romania decided to merge existing and multiple qualification bodies into one: the National Qualifications Authority, who had the mission to elaborate the Romanian NQF following the EQF. In 2016, the dual form of initial VET at EQF levels 3, 4 and 5 was introduced, and in 2018 the dual system was endorsed to the education law. The implementation of dual VET started in 2017/18 and is currently available only at EQF level 3.

The Ministry of Education is the national authority for formal pre-university education (including IVET). They are responsible for the IVET policies developed by the National Centre for Technical and Vocational Education and Training Development (CNDIPT). Sectoral committees are responsible for defining and validating occupational standards and qualifications.

Romanian qualification descriptors are identical to EQF level descriptors, being defined in terms of three categories of learning outcomes: knowledge (theoretical and/or factual); skills, divided into cognitive skills (use of logical, intuitive and creative thinking) and practical skills (manual dexterity and use of methods, materials, tools and instruments); and responsibility and autonomy.

There are two main types of VET programmes in Romania:

- Three-year school-based programmes that provide graduates with a professional qualification at EQF level 3.
- Four-year technological programmes that offer graduated the EQF level 4 “technician qualification”.

2.4. Portugal

In 2007, the European Qualification Framework (EQF) was established to enhance the basic training of the workforce. At the same time, in Portugal, the National Qualifications Agency (ANQEP) was created, aiming at coordinating the development of the NQF, jointly with other competent bodies in the area of vocational education and training (in particular, the Portuguese Ministry of Education).

The PTQF comprises 8 qualification levels, each one defined by a set of indicators that specify the learning outcomes corresponding to the qualifications at that level in terms of knowledge, skills/competences and attitudes. Both PTQF qualification levels and respective descriptors are adopted from the EQF.

The National Catalogue of Qualifications includes school-based VET programs, dependent on the Ministry of Education and Science, and work-based VET programs, financed by the IEFP (Employment and Vocational Training Institute).

There are two types of VET programmes in Portugal depending on whether they are in the educational system or in the employment system:

- Vocational Education System (educational system)
    - Education and Training Courses – CEF:
        - For young people who have completed the 2nd cycle of basic education or who are attending the last year of that cycle. These courses provide a level 2 qualification according to the PTQF.
        - For young people part of the 3rd cycle of basic education. These courses provide a level 2 qualification according to the PTQF.
        - For young people part of higher secondary education. These courses provide a level 4 qualification according to the PTQF.
    - Professional Training Courses:
        - For students who have completed the 3rd cycle of basic education and did not concluded their secondary education. These courses provide a level 4 qualification according to the PTQF.
- Learning System (employment system)

It is intended to support the qualification and certification of young people who, for various reasons, prematurely abandoned the education system. It is a double certification system, where there is strong interaction between theoretical and practical training components. Practical training is mainly in companies/in sectoral training centres (work-based learning system).

3. Spheres of activity in industrial shoe production

Depending on design and make, a shoe consists of several dozen components and its manufacture requires up to 150 work steps. In that sense, shoe production is a relatively complex process, which is mainly characterized by various joining methods. Experienced skilled workers are needed in all departments of a shoe factory, especially at key operations such as cutting, stitching and lasting.

3.1. Cutting and Clicking of Materials for Upper Manufacturing ("Cutting")

The task of the cutting department staff is to cut the shoe parts from upper, lining, interlining and reinforcement materials (leather, synthetic leather, natural or synthetic textiles) in the required geometries.

The following cutting techniques are used:

- Hand cutting with knife and pattern stencils: Mainly used for sample and small series production.
- Clicking machines and cutting dies (swing arm cutting presses for cutting upper and lining leather, travelling head and beam cutting presses for natural and synthetic textile materials): typically used for serial production.
- Dieless cutting on automated CAM cutting tables (oscillating blade / punching / roughing tool, water jet or laser): mainly used for prototyping and small series production, but also for serial production. The cutting geometries are provided by the CAD system.

Material, colour, number of pairs and special requirements can be found in the accompanying specifications that come with each work batch.

Prior to cutting, the leather hides and skins must be checked in terms of differences in thickness and colour, quality zones and eventual defects. Crucial in leather cutting – whether manual, machine cutting or computer-aided – is the compliance with the cutting rules (quality rule, pairing rule, stretch direction) because they influence the quality of the final product. Skill and experience in creating a cutting layout on a hide or skin are also imperative to minimise waste, because the upper leather represents by far the largest single cost item in shoe production.

Further operations in the cutting room are splitting of the cut parts (to reduce them to the required even thickness) and stamping of the parts (article number etc.). The quality control of the cuts is carried out directly in the department.

3.2. Preparation of Upper Parts and Upper Stitching ("Pre-Stitching and Stitching")

Upper manufacturing is time and labour intensive and can only be automated to a limited extent, at least in leather street shoe production. Upper manufacturing (the term used for sewing operations in the footwear industry is "stitching") represents the biggest item in terms

of value creation in footwear production. Experienced stitching operators are particularly sought-after.

In upper manufacturing, a distinction is made between preparatory work ("pre-stitching“) and the actual upper assembly (“stitching”).

The stitching work to be done on a shoe depends on the model. Essentially, upper manufacturing consists of assembling all lining parts, assembling all outer upper parts, and then stitching together lining and outer upper with some subsequent final operations.

The necessary pre-stitching operations depend on the type of shoe, the specific model and the material. Typical pre-stitching operations are:

- Skiving (bevelling respectively thickness reduction of the edges of shoe parts)
- Splitting (to achieve homogenous thickness)
- Marking (e.g. to provide guidance for stitching or punching)
- Edge inking (open edges of non through-dyed leathers)
- Cementing (applying adhesive to parts and joining them together)
- Folding (to fold down previously skived edges with adhesive)
- Perforating, punching, embossing
- Reinforcing (with adhesive or ironing-on)
- Crimping (pre-moulding for better shape, e.g. for boot legs)

Pre-stitching operations are done partly manual, partly on machines. They can be decisive for the quality of the final product.

Upper assembly is done on stitching machines. There are various types: Flat-bed, post-bed or cylinder-arm machines, as well as single-needle, two- and three-needle machines to perform the numerous stitch types for closing and decorative seams.

3.3. Preparation of Uppers and Bottom Parts for Lasting and Lasting (“Lasting”)

“Lasting” means attaching the lasting margin (i.e. the lower edge of an upper) by means of tacks and/or adhesives to the insole, which can be considered as the constructive backbone of footwear, although it is not at all visible on the final product. Lasting is one of the crucial operations in footwear production. Depending on the construction method, the lasting proceedings can differ.

Prior to lasting, toe puffs and heel counters must be inserted into the finished uppers in between upper and lining material in order to reinforce toe and heel. Toe puffs are usually ironed in. Leather fibre-board heel counters are dipped into latex adhesive, dried and then inserted by hand; another type of heel counters are thermoplastic heel counters. Some shoe types require crimping of the vamp, and most shoe types require back part moulding (hot and cold, depending on the type of heel counter). In parallel, lasts and insoles are prepared. The insoles are stapled to the last.

Thicker upper leathers should be treated with tempered water vapour or softener in order to prevent the grain from cracking (during the toe lasting process, the material must endure an elongation of up to 30%). Next to the toe lasting machine, a toe activating device is positioned,

which heat-activates the toe puff (some devices work with tempered water vapour to soften the leather and toe puff, and with a mould shaped like the front part of the last to increase mouldability and to pre-mould the toe area).

Lasting starts with pulling the upper in the correct position over the last. Most companies use the two-machine-lasting system, i.e. toe lasting is performed on the first machine and then side-and heel lasting on the second machine. The machine pincers pull the upper material close to the last and the lasting edge is attached under the insole.

During the lasting process, the upper is exposed to high tensile forces in order to shape it to the last.

Some factories use a pounding machine or just manual hammering to improve the lasting result (i.e. flatten the lasting edge and get rid of eventual creases).

The subsequent steps are throughput of the lasted uppers through heat- and cool-setting tunnel transport systems which improve the shape retention of the materials as well as the fit of the final product.

3.4. Assembly of Uppers and Bottom Parts ("Assembly")

In the assembly room, upper and bottom parts are joined. By the time the batch of lasted uppers enters the assembly room, the bottom parts in the correct sizes and numbers have been prepared and put on the rack shelves together with the uppers.

First, the staples fixing the insole to the last bottom need to be removed. The next step is roughing the lasting edge as a surface preparation for the adhesive bond. The objective of roughing is to smoothen potential creases, to remove the grain layer of the leather because it contains oils or other greases or surface treatments which will weaken the bonding strength, and to increase the bonding surface. Roughing can be performed on machines (roughing machines or combined roughing/cementing machines); however, manual roughing remains widespread. It is imperative to precisely respect the roughing contours and to remove just the grain layer in order to preserve the structural strength of the material. Roughing dust must be thoroughly blown off.

Then a filler is inserted into the cavity on the last bottom in order to compensate for the height difference between last bottom and lasting edge.

The next step is cementing, i.e. to apply adhesive onto the roughened shoe bottom (with a cementing or a combined roughing/cementing machine) as well as onto the sole. Although robotised adhesive application solutions for sole cementing exist, manual application with a brush is still common. Depending on the type of soling material, the appropriate adhesive needs to be chosen. Each adhesive type requires a specific surface treatment; the objective of pre-treatments is to clean the bonding surface and to create ideal conditions for the adhesive to adhere to the material.

After the mandatory drying times, the soles can be pressed. Therefore, the adhesive (sole and upper) is re-activated, the soles are positioned manually onto the last bottoms and the whole

is then inserted into a sole press (hydraulic or pneumatic depending on their application suitability).

Alternatively, soles can be sewn-on, vulcanised or direct-injected depending on the construction method.

The subsequent operations are delasting and attaching the heel – if the shoe model provides for a heel. The soles of stitch-down or welt-sewn footwear require finishing operations such as scouring and/or polishing of the edges.

3.5. Finishing

In the finishing room, the shoes are prepared for sale and boxed.

Finishing operations include various work steps.

Depending on the type of upper material (leather finish and colours) the shoes must be cleaned and – if necessary – repaired. For this purpose, a wide range of tools and auxiliaries are available, which must be selected very carefully, especially for sensitive upper materials such as aniline leather or suede. Wrinkles are ironed out or smoothed-out with a blow-drier.

Spray-finishes, waxes and creams are applied, insocks or seat sock pieces are inserted, and decorative elements fixed.

A task of particular importance is the final quality control prior to shipment (please see also sphere 6; “Quality Assurance”.).

Finally, the shoes are boxed in individual boxes and 10 or 12 or more pair boxes put in shipping cartons (preparation for shipping is often done in the dispatch warehouse).

3.6. Quality Assurance

Quality assurance of footwear relates mainly to three aspects: Visual appearance, fit and functional characteristics (e.g. durability, performance, absence of harmful substances).

Sensibly, these controls should not only be performed on the finished footwear, but at all manufacturing stages. All operators should systematically self-check their work, and all work batches should undergo a quality check before leaving each production department to avoid problems in subsequent processes. A visual quality control before boxing the shoes is standard.

When a customer performs pre-shipment inspections of shoes that were produced by a supplier, the visual control is carried out according to a sampling plan which defines how many shoes must be inspected and in order to be able to decide whether a production batch can be accepted or not.

Fit and wear testing is done by a panel of reliable and product sensible testers who will fill in a test questionnaire. This is commonly organised by the product development team. Bigger companies have dedicated fit and wear testing departments.

The control of technical aspects consists in subjecting the shoes to a series of physical and mechanical tests to ensure their quality and safety. The absence of harmful substances is

checked through chemical testing. There are legal standards for the performance of footwear testing, defining the requirements in terms of sampling, conditioning of the samples and test execution in order to facilitate comparison of the results. If the test results are intended to be communicated to customers or other stakeholders, it is recommended to commission an independent laboratory to perform the testing. For certain types of shoes, such as safety shoes, this is even mandatory.

Definition of INSPECTION (according to ISO 2859-1): “Activity such as measuring, examining, testing or gauging one or more characteristics of a product or service, and comparing the results with specified requirements in order to establish whether conformity is achieved for each characteristic.”

3.7. Footwear Design

Shoe designers do not only design individual models, but also concepts for entire collections. The main focus is always to meet the tastes and needs of future buyers, both in terms of fashion as well as of quality and fit.

Designers must be creative, able to draw, have a sense of emerging trends and an eye for harmonious lines and colours. The success of the entire company depends on the success of the models with the customers and thus the success and the employment situation for the entire company.

A shoe designer should be familiar with the shoe making process in order to design models in such a way that the effort in production remains proportionate to the achievable selling price and that the manufacturing can be done with the existing equipment and skills.

Many designers still draw on paper or on deep-drawn copies of the last surface. Younger designers are increasingly moving from initial manual design sketches to design on 3D CAD systems. 3D CAD systems save time and money by permitting to evaluate designs already at an early stage on the screen (which can be shared with co-workers no matter where on the globe) instead of going through the traditional time-consuming prototyping process. In addition, 3D CAD systems generate geometry data for computer-aided machines (CAM and CIM machines).

3.8. Technical Development

When the designer has completed his work, the results are sketches on paper or on deep-drawn last copies, at least in most small and medium-sized enterprises of footwear industry. Only few designers of SMEs in the field of leather street shoes work with digital tools. In the universe of sports shoes, things are often different, especially since global agreements and speed play an even greater role here and CAD systems are very helpful for gaining valuable time.

No matter whether the designer produces sketches on paper or on deep-drawn last copies, the result is an upper design in the first place. Typically, the designer specifies the upper materials to use. In addition, the designer also creates the shoe bottoms, i.e. outsoles and

heels, to match the respective lasts (usually also on paper). Bottom parts can also be selected from respective suppliers.

Designers therefore often purely focus on the creative part. Once a design idea exists, this is when the technical developers come into play. They take care of the digitization and the technical development of the designs.

Their work focuses on the following questions: How can the idea sketch of a shoe be broken down into producible individual parts with the correct dimensions and the necessary additions and reductions for production? How do you get from a 3D design on a deep-drawn last copy to stencils or punching knives for upper parts, which are to be cut from 2D materials and then reassembled into 3D objects? Which types of seams, of lining and reinforcement materials and, more generally, which operations in production are necessary to convert the idea into a product that the company can actually manufacture with the existing machinery and the know-how of the production staff?

3.9. Production Planning

Footwear production planning is about distributing and coordinating all activities related to footwear manufacturing.

Production planning activities include the following functions:

- Product data management: Classification of products in terms of size, style, variants, design, target market, materials, components, technical specifications etc.
- Order management: Inventory, manufacturing and delivery planning according to deadlines and available resources
- Manufacturing planning and monitoring: Planning and coordinating all the manufacturing phases and tracking work in progress and consumption
- Materials and components planning and inventory management: Ordering materials and components according to work orders and managing bills and keeping inventory
- Delivery and finished products stock management: Plan, organise and monitor logistics and supply chain activities
- Workforce management: Organising workforce accordingly to availability and keeping daily records of work hours and productivity
- Financial Management: Accountancy system that provides accurate and on time information regarding cash flows, fund flows, recurring expenses, costing and efficiency of manufacturing systems, budgeting and fund allocations

Depending on the company (size, organisation of departments, distribution of activities etc.) part of the activities related to production planning can be included in other departments.

For increased efficiency, companies use software systems for production planning. The main software categories are ERP (Enterprise Resource Planning), PDM (Product Data Management) and PLM (Product Lifecycle Management) systems.

4. Qualifications from the footwear sector in partner countries

In recent years, several articles have been published arguing that general qualifications frameworks are somehow nothing but "a paradigmatic case of travelling educational reforms" (*see* SIQAF 2018). Therefore, given the belief that sectoral qualification frameworks may add value to general qualification frameworks in terms of transparency of qualifications in sectors, the ICSAS project has created a qualification framework for the footwear sector.

For this, after conducting a research, the qualifications for industrial shoemaking in EQF levels 2-4 were extracted from the national catalogue of qualifications of each partner country. These qualifications will be discussed in more detail in the following subparagraphs.

It should be recalled that this project is based on the WBL (Work-Based-Learning) during IVET (Initial Vocational Education and Training), which is why the EQF level 2-4 qualifications have been chosen.

4.1. Germany

German qualifications on level 2-4 (European Qualification Framework (EQF)/Deutscher Qualifikationsrahmen (DQR)) with relevance for industrial shoe production are presented in table 2.

Name of qualification (DE)	Name of qualification (EN)	DQR level	EQF level	Length	Permeability	Amount of learners
Einstiegsqualifizierung „Herstellung von Schuhen"* (IHK 2019)	Entry training "production of shoes" *	2	2	9 months	Might be (in fact: this option almost never occurs) recognised when starting an apprenticeship as an "industrial shoemaker" via a reduction of length by 6 months	Not published
Fachkraft Lederverarbeitung (BiBB 2011)	Assistant for leather processing	3	3	2 years	Fully recognised as the first 2 years when starting an apprenticeship as an "Industrial shoemaker"	6 new contracts in 2017 (according to BiBB)
Industrieller Schuhfertiger (BiBB 2017)	Industrial shoemaker	4	4	3 years	-	36 new contracts in 2017 (according to BiBB)

Table 2: German qualifications from shoe sector on level 2-4
** No qualification with relevance for labour market*

Main features of **Entry training "production of shoes"**:

- Very short curriculum (1 page!)
- It refers only to spheres of activity "cutting" and "stitching".
- "Basic cognitive and practical skills" or "largely under supervision" (from QF level 2) describe learning outcomes (LO) quite realistic.
- It includes the *option* to shorten a qualification as an "industrial shoemaker" by 6 months.

Main features of **Assistant for leather processing**:

- It equals the first 2 years of the curriculum of the industrial shoemaker; curricula for learning venue school even states: "Common classes for both vocations are possible." (and real, due to small amounts of apprentices)
- Fully *creditable* against "industrial shoemaker"; holders of "Assistant for leather works" need only 1 additional year of VET to become an industrial shoemaker.
- It refers to spheres of activity "cutting", "stitching" and "finish" (only leather, not soles/shoes).
- "A broad spectrum of cognitive and practical skills" or "work autonomously" (from QF level 3) describe learning outcomes (LO) for these 3 core spheres quite realistic.
- It offers additionally insights into peripheral spheres "technical development" (station: "technical pattern making (uppers)", "design" (station: "upper coordination") and production planning.

Main features of **Industrial shoemaker**:

- It covers all 5 core spheres (cutting, stitching, lasting, assembly, finishing)
- "A spectrum of cognitive and practical skills" or "set own learning and work objectives" (from QF level 4) describe learning outcomes (LO) for these 5 core spheres quite realistic.
- It covers "production planning" and "quality assurance" in parts; only the planning of the production of a shoe (not a whole production line) resp. quality assurance of established materials and processes.
- It offers additionally insights into the other 2 peripheral spheres.

4.2. Spain

Spanish qualifications on level 2-4 (European Qualification Framework (EQF)/Marco de Cualificaciones Español (MECU)) with relevance for industrial shoe production are presented in table 3.

Name of qualification (ES)	Name of qualification (EN)	MECU level	EQF level	Length	Amount of learners
Fabricación de calzado a medida y ortopédico (TCPC0212)	Custom-made and orthopaedic footwear manufacturing	2	2	690 hours	Not published
Patronaje de calzado y marroquinería (TCPC0112)	Shoes and leather goods pattern making	3	3	780 hours	
Técnico en calzado y accesorios de moda (2017/8045)	Footwear and fashion accessories technician	4	4	2000 hours	

Table 2: Spanish qualifications from shoe sector on level 2-4

Main features of **Custom-made and orthopaedic footwear manufacturing**:

- It is a professional certification consisting of four units of competence: selecting raw materials, manufactured products, tools, and custom and orthopedic shoemaking machines; adapting base lasts to manufacture custom-made and orthopedic footwear; manufacturing custom-made and orthopedic footwear; and, adapting or manufacturing tap shoes.
- This professional certification included in the Catalogue of Qualifications is linked to the Modular Catalogue for Vocational Training by modules and learning units, which students must pass.
- It covers all ICSAS core spheres of activity (cutting, stitching, lasting, assembly, finishing) and 3 ICSAS secondary spheres of activity (production planning, technical development, design).
- The posts in the industrial shoe manufacturing related to this qualification are footwear hand finisher, footwear hand cutter, footwear hand/machine stitcher and footwear hand laster.

Main features of **Shoes and leather goods pattern making**:

- RD991/2013 of the 13th December updated RD2574/1996, where it was included this professional certification.
- It consists of five units of competence: analysing raw materials, products and clothing, footwear and leather goods processes; analysing and interpreting the design, collaborating in the definition of the product in textile and leather; carrying out the adjustment and cutting for footwear and auxiliary models; perform the cutting of patterns for leather goods and saddler; and, carrying out the industrialisation of footwear and leather goods patterns.

- This professional certification included in the Catalogue of Qualifications is linked to the Modular Catalogue for Vocational Training by modules and learning units, which students must pass.
- It only covers 3 secondary spheres of activity (design, technical development and quality assurance).
- The posts in the industrial shoe manufacturing related to this qualification are footwear pattern maker, footwear model maker, footwear grader, footwear adjuster, footwear CAD/CAM technical designer.

Main features of **Footwear and fashion accessories technician**:

- There are 2 curricula for this qualification: the national curricula developed by the Ministry of Education and the regional curricula, which is the adaptation of the national curricula that regions where the qualification is going to be implemented have made.
- There are admission requirements. Candidates must be in possession of the title of Secondary Education Graduate/higher academic level, a title of Basic Vocation Training or a title of Technician, or have passed the university admission test for people over 25. If the candidate does not have any of these titles and is over 17, he/she can take the entrance test to intermediate level vocational training.
- It covers all ICSAS core spheres of activity (cutting, stitching, lasting, assembly, finishing) and 3 ICSAS secondary spheres of activity (production planning, technical development, quality assurance).
- It includes the *option* to validate a certain module that students have passed within this VET qualification with a similar module in the professional certification focusing in that topic (ex. pattern making).
- The posts in the industrial shoe manufacturing related to this qualification are footwear hand/machine cutter, footwear hand/machine cutter, industrial sewing machine operator and shoemaker.

4.3. Romania

Romanian qualifications on level 3 and 4 (European Qualification Framework (EQF)/ Romanian Qualification Framework (ROQR)) with relevance for industrial shoe production are presented in table 4.

Name of qualification (RO)	Name of qualification (EN)	ROQR level	EQF level	Length	Amount of learners
Cizmar / Confectiner articole din piele si inlocuitori 753602	Shoemaker/Industrial shoemaker	3	3	3 years	165 (2019-2020 academic year)
Croitor stantator piese incaltaminte 815603	Cutting operator				
Pregatitor piese incaltaminte 815604	Pre-stitching operator				
Cusator piese din piele si inlocuitori 815605	Stitching operator				
Tragator fete pe calapod 815606	Lasting operator				
Talpuitor industrial 815607	Soling operator				
Finisaor incaltaminte 815608	Finishing operator				
Tehnicial in textile-pielarie	Technician in textile and leather industry	4	4	4 years	Not available
Tehnician incaltaminte	Technician in footwear industry				
Tehnician designer pentru industria textile si de pielarie	Designer technician in textile and footwear industry				

Table 4: Romanian qualifications from shoe sector on level 3 and 4

Main features in **level 3 and 4 qualifications**:

- All qualifications are regulated at the national level, by official documents named SPTs (Standard for Professional Training). Knowledge, skills and attitudes are described according to EQF recommendations
- The curricula for both level 3 and 4 are focused on the core shares of the shoemaking process, like cutting, stitching, lasting, assembling and finishing; The other activities, like design and development, production planning or quality control, are not properly included
- Knowledge, skills, and attitudes are described according to EQF recommendations. However, the national curricula give a general description, without making a direct link with the work environment (ex. Learning Stations, core spheres of activities…)
- The number of learners for each qualification is regulated by official documents approved by the Ministry of Education; Regarding, the number of learners enrolled in footwear study programs, each year a less and less at national level

- Supportive legislation and methodologies for dual training are provided by the Ministry of Education, but the companies from the footwear industry cannot support it due to their size (SMEs) and limited financial resources.

4.4. Portugal

Portuguese qualifications on level 2 and 4 (European Qualification Framework (EQF)/ Portuguese Qualification Framework (PTQF)) with relevance for industrial shoe production are presented in table 5.

Name of qualification (PT)	Name of qualification (EN)	PTQF level	EQF level	Length	Amount of learners
Operador de Fabrico de Calçado	Footwear Manufacturing Operator	2	2	3 years	Not available
Técnico/a de Fabrico Manual de Calçado	Footwear Manual Production Technician	4	4		
Técnico/a de Modelação de Calçado	Footwear Pattern Maker				
Técnico/a de Gestão de Produção de Calçado e Marroquinaria	Footwear & Leather Goods Production Manager				

Table 5: Portuguese qualifications from shoe sector on level 2 and 4

Main features of **Footwear Manufacturing Operator**:

- Recognized and certified by ANQEP (National Agency for the Qualification and Professional Education Training) after approval of the sectoral counselling group for fashion industries, involving all technical experts and social partners;
- Published in the Employment and Labour Gazette nº 29 on 8th August 2013;
- This professional performs cutting, stitching preparation, stitching, assembly and finishing of footwear using different materials, equipment and techniques according to the established procedures on quality, maintenance and safety and health at work. This professional cut the different pieces of the footwear model, do all pre-stitching operations, namely skiving, splitting, crimping, punching, folding, apply reinforces, metallic accessories, perform all stitching operations with column and flat stitching machines, perform all the assembling operations, included in cemented footwear construction and eventually other type of constructions, perform all finishing operations, and control the quality of the work done.

Main features of **Footwear Manual Production Technician**:

- Recognized and certified by ANQEP (National Agency for the Qualification and Professional Education Training) after approval of the sectoral counselling group for fashion industries, involving all technical experts and social partners;
- Published in the Employment and Labour Gazette nº 30 on 15th August 2009;
- 1st Update published in Employment and Labour Gazette nº 48 on 29th December 2012, entered into force on 29th March 2013;
- This profile was developed having in mind the craftsmanship character of Footwear sector in Portugal;
- This profile has associated a training path for the apprenticeship training model which represents the closest possible training model to the dual training (combines training in a centre and in the company for young people 15+);

- Manually run all modelling, cutting, closing, assembling and finishing footwear, as well as mechanical sewing operations thereof in accordance with the quality standards, environment, health and safety. In addition, is able to run his/her own business, handling the product promotion in various channels namely on-line and leading with management aspects of a micro company.

Main features of **Footwear Pattern Maker**:

- Recognized and certified by ANQEP (National Agency for the Qualification and Professional Education Training) after approval of the sectoral counselling group for fashion industries, involving all technical experts and social partners;
- Published in the Employment and Labour Gazette nº 29 on 8th August 2013, entering in force in the same day;
- Update published in Employment and Labour Gazette nº 17 on 8th May 2014, entered into force on 8th May 2014;
- To plan and develop moulds for different footwear models, defining technical specifications regarding the manufacturing process, in order to assure the quality, productivity and security. The footwear pattern maker operates at an industrialization level, working as an interface between design and production, transforming designer's specifications into technical requirements, footwear concepts into manufacturing lines, making the patterns for uppers, linings and bottom components, producing technical drawings for various range of tools (cutting dies, mould, etc.), accompanying prototyping and evaluating footwear prototypes, grading and producing sizing samples, performing required tests for samples and confirming the customer's qualitative and pricing constrains.

Main features of **Footwear & Leather Goods Production Manager**:

- Recognized and certified by ANQEP (National Agency for the Qualification and Professional Education Training) after approval of the sectoral counselling group for fashion industries, involving all technical experts and social partners;
- Published for the first time in the Dispatch nº 13456/2008 14th May that approved the original version of the National Catalogue of Qualifications. The 1st update was published in the Employment and Labour Gazette nº 47 on 22th December 2009 and entered in force on 22nd March 2010. After that it had several updates. The last versions entered in force in 22nd October 2017;
- To plan, distribute, coordinate, monitor and control the activities of the different stages of footwear manufacturing, accordingly to the production objectives, deadlines and the available resources, taking into account the use of new generation equipment and materials, with a view to quality and productivity and the accomplishment of environment, energy rationalization, health and safety established standards.

5. SQF industrial shoemaker level 2-4

With respect to these descriptions, we decided to subdivide the “broad range” (EQF level 4, skills) or “basic cognitive and practical skills” (EQF level 2, skills) for our sector into three main categories:

- autonomous performance
- initiation
- partly; e. g. planning of a single product (not production line)
- not tackled

The qualifications have been grouped below according to their level in the EQF. Each qualification is broken down into the spheres of activity selected by the ICSAS project, and those covered in the qualification are marked in color. The color with which they are marked, as explained before, shows the broad range and basic cognitive and practical skills in each qualification.

5.1. All qualifications on EQF levels 2-4 from DE, ES, PT and RO

autonomous performance
initiation
Partly; e. g. planning of a single product (not production line)
not tackled

Country	Level according to EQF (Qualification)	Spheres of activity in footwear sector								
DE	Level 2 (Entry training)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
DE	Level 3 (Leather processing)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
DE	Level 4 (Shoemaker)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
PT	Level 2 (Footwear manufacturing operator)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
PT	Level 4 (Footwear patternmaker)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
PT	Level 4 (Footwear Manual Production Technician)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
PT	Level 4 (Footwear & Leather Goods Production Manager)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 3 (Shoemaker/Industrial shoemaker)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 3 (Cutting operator)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 3 (Stitching operator)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 3 (Lasting operator)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 3 (Soling operator)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 3 (Finishing operator)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 4 (Technician in textile and leather industry - footwear included)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 4 (Technician in footwear industry)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 4 (Designer technician in textile and footwear industry)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
ES	Level 2 (Custom-made and orthopaedic footwear manufacturing)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
ES	Level 3 (Shoes and leather goods pattern making)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
ES	Level 4 (Footwear and fashion accessories technician)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance

5.2. Level 2

autonomous performance
initiation
Partly; e. g. planning of a single product (not production line)
not tackled

Level 2

Country	Level according to EQF (Qualification)	Spheres of activity in footwear sector								
DE	Level 2 (Entry training)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
PT	Level 2 (Footwear manufacturing operator)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production Planning	Quality assurance
ES	Level 2 (Custom-made and orthopaedic footwear manufacturing)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance

5.3. Level 3

autonomous performance
initiation
Partly; e. g. planning of a single product (not production line)
not tackled

Level 3

Country	Level according to EQF (Qualification)	Spheres of activity in footwear sector								
DE	Level 3 (Leather processing)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 3 (Shoemaker/Industrial shoemaker)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 3 (Cutting operator)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 3 (Stitching operator)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 3 (Lasting operator)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 3 (Soling operator)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 3 (Finishing operator)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
ES	Level 3 (Shoes and leather goods pattern making)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance

5.4. Level 4

autonomous performance
initiation
Partly; e. g. planning of a single product (not production line)
not tackled

Level 4

Country	Level according to EQF (Qualification)	Spheres of activity in footwear sector								
DE	Level 4 (Shoemaker)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
PT	Level 4 (Footwear pattern maker)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
PT	Level 4 (Footwear Manual Production Technician)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
PT	Level 4 (Footwear & Leather Goods Production Manager)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 4 (Technician in textile and leather industry - footwear included)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 4 (Technician in footwear industry)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Level 4 (Designer technician in textile and footwear industry)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
ES	Level 4 (Footwear and fashion accessories technician)	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance

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8. List of tables