Skill needs assessment for the arts and crafts sector

Evidence from MOSAIC

Centre of Vocational Excellence

MOSAIC
Mastering job-Oriented Skills in Arts & crafts thanks to Inclusive Centres of vocational excellence

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Disclaimer

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EXECUTIVE SUMMARY

The current report builds on the findings of MOSAIC (Mastering Job-Oriented Skills in Arts and craft thanks to Centres of vocational excellence), an Erasmus+ project involving 7 countries and 15 main partners that aims to improve vocational training in arts and crafts in order to meet the challenges posed by digital, environmental and socio-economic developments. MOSAIC addresses specific key issues for vocational training schools and companies dealing with crafts, tradition and creativity, among which the most important is the need for skills. Between July 2022 and May 2023, MOSAIC partners conducted research to map the skill gaps (the lack of specific expertise of the existing workforce) in the project partner countries and beyond. Although the focus is set on mapping skill needs in specific impact areas such as sustainability, inclusion and digitalisation, the domination of existing and potential future skills in arts and crafts across sub-sectors like wood, jewellery, traditional crafts and design is explored, alongside their implications for education, as well as their impact on the resilience and growth of the sector.

To the purpose of this report we build on the definition of arts and crafts adopted by MOSAIC, which uses a historical and cultural lens that is able to encompass the different definitory nuances present in project partner countries. In the frame of the MOSAIC consortium we consider arts and crafts directly linked to the more general branch of crafts, whose development has accompanied the evolution of humankind. When we talk about arts and crafts in this report, we refer to the 4 sub-sectors representing the MOSAIC focus: woodwork, jewellery making, traditional & rare crafts and design, arts and industry. More specifically, the focus of this report are the businesses operating in these 4 sub-sectors, including sole traders. These businesses are part of the broader cultural and creative industries, and although their composition is heterogeneous and mainly composed of small and medium enterprises - in the case of craft entities we can speak about micro-enterprises and sole trader/freelancers - they all produce handmade or customised products. In doing so, they cater to niche markets, offering unique, personalised and high-quality products that stand out from mass production.

Despite the importance of craft SMEs for the EU economy and society, it is difficult to retrieve transnational evidence of the needs surrounding this specific sector, in particular those connected to skills, which are evolving at an exponential pace. This report tackles this gap using a mixed method approach. In doing so, the study provides an evidence review on the skills needed in arts and crafts in 6 countries (France, Italy, Finland, Bulgaria, Canada, Armenia) by combining different methods consisting in an online, structured questionnaire targeting 290 arts and crafts businesses in partner countries and 6 focus groups organised in MOSAIC partner countries and involving 36 business representatives. The report is based on findings from these two methods. For reasons of representativity and because the primary data collected through the survey and focus groups represents a limited sample shedding

light on specific geographical areas, rather than the broad national context, we present these findings inside the broader MOSAIC context. The findings of this study contribute to the achievement of Objective 3 of MOSAIC, which refers to the monitoring and anticipation of skill needs in this sector through investigation and the establishment of an Observatory which constantly feeds into the research process in the long-term. They also align with important EU priorities and initiatives such as the European Year of Skills[1], Vocational Education and Training Excellence[2] and the European Artistic Craft Days[3] among others.

THE SKILLS CHALLENGE

The cultural and creative industries, of which the arts and crafts sectors are part of, represent a major contributor to the EU economy, registering growth rates which outstrip other European sectors. Therefore, addressing skill needs which can continue to sustain this growth is imperative for guaranteeing a continuous upward trend. Evidence suggests that rapid developments in terms of digital technologies, new forms of organisation/business models, social matters (equality) as well as environmental sustainability are changing the structure of the sector and with it, also the types of skills that are necessary to operate in the field. A socially, digitally, environmentally and entrepreneurially knowledgeable workforce is fundamental in seizing further growth opportunities. However, this process comes with different challenges.

Our study suggests that although arts and crafts businesses have a real interest in **social inclusion, digitalisation and sustainability** topics, they face a series of challenges in operationalizing them. These can be overcome by developing specific skills connected to: **self-development** (e.g. versatility, flexibility, autonomy, self-criticism, lifelong learning, perseverance and proactive mindset), **work-value relation** (e.g. motivation, willness, curiosity, punctuality), **entrepreneurship** (e.g. change management and creative entrepreneurship), **digitalisation** (e.g. digital literacy and digital intelligence) and **cooperation and collaboration** (e.g. relational abilities)

[1] https://year-of-skills.europa.eu/index_en

[2] https://vocational-skills.ec.europa.eu/history/awards_en

[3] https://wcc-europe.org/whats-on/news/european-artistic-crafts-days-2023/

KEY INSIGHTS & STATISTICS

Current skill needs

- ***Social inclusion, digitalisation and sustainability*** *are important drivers of skills, each presenting a different level of difficulty in operationalizing specific capabilities*
- ***Soft skills*** *remain among the* ***top skills*** *needed (reported by 68% of questionnaire respondents); however* ***manual*** *skills (reported by 67% of questionnaire respondents) and* ***entrepreneurship*** *skills are also needed, even if less explicitly manifested.*
- *59% of questionnaire respondents report a* ***high need*** *for* ***entrepreneurial skills***
- *Social inclusion is a highly debated area of skills, with most businesses not specifically considering to know more about it or needing to build skills around it*
- *Although 55% of questionnaire respondents value highly the need for* ***green skills*** *across all business operations,* ***sustainability*** *remains a low priority area, mainly due to the* ***difficulties*** *of embedding green practices at all business levels*
- ***Digitalisation*** *remains one of the top drivers of craft skills (61% of questionnaire respondents report a high need for digital skills). However, priority areas depend largely on the* ***size of the business****:* ***marketing & sales*** *is the most invested area for small businesses, while for large businesses digital skills are needed more around* ***production and planning****.*
- ***Entrepreneurial abilities*** *remain fundamental for the thriving of businesses, yet they cannot be limited at understanding the fundamentals of running a business*
- *The concept of* ***new business models*** *is not much deployed within arts & crafts, yet specific* ***soft and technical skills*** *related to entrepreneurial mindsets and new forms of organising businesses represent priority areas for skill development*
- ***Automation & robotic skills*** *are the least needed, most probably reflecting the mistrust and controversial opinions of respondents surrounding a field that is still in its early development*
- *61% of questionnaire respondents estimate that a* ***combination of skills*** *is needed*
- *In line with the evidenced priority areas, we can distinguish the following important* ***groups of skills:*** ***social and human skills*** *(entrepreneurship, sustainability and social/soft skills),* ***manual skills, automatisation skills and operational skills*** *(conceptualisation, planification and digitalisation skills)*

Future skill needs

- ***Digital skills*** *(reported by 77.5% of questionnaire respondents) and skills fostering sustainable production (reported by 73% of questionnaire respondents) remain among the top areas estimated as necessary for the future*
- *Although only 39% of questionnaire respondents believe they will have a high need for* ***social skills****, this could be attributed to the strong impact of digitalisation, which*

shifts perceptions to the detriment of soft skills (soft & digital skills often work as opposites)

- ***Manual and entrepreneurial skills*** *are expected to be also in demand: manual capabilities are perceived as contributors to personal development, brain-hand coordination and to acquiring valuable hands-on expertise; the acquisition of entrepreneurial skills on the other hand is connected to the lack of adequate teaching*
- ***Transversal skills*** *such as flexibility is seen as essential for ensuring the resilience and adaptability to shifts. However, business administration tasks can often limit the exercise of flexibility*
- ***Collaboration/networking skills*** *and* ***hands on*** *work (e.g. apprenticeships) are seen as necessary for the future development of the sector*
- ***Informal processes*** *in skills acquisition remain an important, yet open subject of discussion, highlighted by the focus groups*
- *In conclusion, future generations of workers are expected to be able to* ***creatively combine*** *technical and manual skills, with the latest digital knowledge*

Glossary

This glossary contains words and expressions used frequently throughout this report.

CAGR	The compound annual growth rate (CAGR) is the rate of return (RoR) that would be required for an investment to grow from its beginning balance to its ending
CoVe	CoVEs (Centres of Vocational Excellence) are a key feature of the Reform of Vocational Education (the RoVE).
Cultural and creative industries	Cultural and creative sectors are comprised of all sectors whose activities are based on cultural values, or other artistic individual or collective creative expressions and are defined in the legal basis of the Creative Europe Programme
Environmental sustainability	Environmental sustainability is the ability to maintain an ecological balance in our planet's natural environment and conserve natural resources to support the wellbeing of current and future generations.
Greenwashing	Greenwashing is when a company purports to be environmentally conscious for marketing purposes but actually isn't making any notable sustainability efforts.
Social inclusion	Social inclusion is the process by which efforts are made to ensure equal opportunities – that everyone, regardless of their background, can achieve their full potential in life.
New business models	A business model defines how a company will create, deliver, and capture value. New business models refer to alternative forms of organising work compared to standard ones.
Digitalisation	Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities.
Craft observatory	A building, place, or institution designed and equipped for mapping the needs of the crafts sector.
Skills	The ability to do something well.
Skill gap	A skills gap is the difference (or gap) between the skills that an employer needs and the skills that their workforce (or an employee) currently has.
SME	The European Union has defined an SME (small and medium enterprise) as a legally independent company with no more than 500 employees.
Systemic approach	A systemic approach involves studying one's own interactions, that is, one's own place in a system. Like systems theory, the systemic approach analyses the place of an entity in its environment, seeking to identify in all their complexity the interactions that exist around that entity.

Sole trader	A sole trader is a person who is the exclusive owner of a business, entitled to keep all profits after tax has been paid but liable for all losses.
Vocational skills	Vocational skills are a set of skills that help a person to get, perform, and perfect a job.

1. INTRODUCTION:

Context and objectives

We have identified a lack of academic research and reliable data regarding craft skills and processes at national, European and international level. This is important for recognising the skills needed in order to renew and revitalise the arts and crafts environment – to locate and bridge the skills gaps between traditions and contemporary needs and work. It is particularly for this reason that a skills gaps analysis in the field of arts and crafts has been conducted – to find the gaps between existing and required skills, and in later stages, to develop strategies and training modules to bridge the gaps.

This study was conducted in the frame of the MOSAIC project (Mastering Job-Oriented Skills in Arts and craft thanks to Centres of vocational excellence), an European ERASMUS plus project involving seven countries - Armenia, Belgium, Bulgaria, Canada, Finland, France, Italy - and 15 main partners - training centres (6), universities (2), companies (1), chambers of commerce and industry (3), mobility service provider (1), cultural industries expert (1), multiplier organisation (1) - plus a significant number of secondary partners. In its declaration of intent, the European MOSAIC project defines itself as follows: "Through this project, we want to address certain key issues for vocational training schools and companies dealing with crafts, tradition and creativity, by providing concrete solutions in tune with the times, which will guarantee the full employability of learners and the competitiveness of the business sector" (MOSAIC, 2022). In other words, what unites the different partner countries and the different players in the project is this collective reflection on arts and crafts and, more specifically, their teaching. It is important to emphasise that MOSAIC is the first CoVE to focus entirely on the arts sector and crafts, as part of the cultural and creative industries.

MOSAIC's main objective is to improve the quality of vocational training in the arts and crafts in order to meet the challenges posed by digital, environmental and socio-economic developments, by proposing to generate innovations from three angles: **technical**, **educational** and **social**. To achieve this, MOSAIC has targeted specific craft sectors, namely: traditional and rare crafts, precious metals and jewellery, furniture and wood, design and industry, which correspond to the fields of expertise of the various partners as well as to the local and national specificities of the countries represented. In addition to the main objective, the project is further structured by five specific objectives:

1. Increase and improve collaboration between companies, VET centres and higher education institutions, in order to achieve a state of mutual fertilisation;

2. To update the range of initial and continuing vocational training courses in the arts and crafts by proposing new training modules;

3. Encourage internationalisation and transnational strategies in response to changes in VET and society;

4. Building a forward-looking VET by integrating digital methodologies and environmental sustainability;

5. Improve strategies for the inclusion of VET providers and facilitate the transition to the world of work in the arts and crafts for those with fewer opportunities.

The MOSAIC project plan recognises the following[4]:

> The European Arts & Crafts sector covers a wide diversity of trades, as a mirror of rich and strong identities. It carries and promotes important values such as excellence, singularity, based on human creativity and self-surpassing. Craftsmen represent a considerable workforce at national and European scale, and they actively contribute to the attractiveness of their territory in terms of culture, tourism, employment and economic repercussions.
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> Craftsmanship is the heir of a heritage that needs to be preserved, protected and passed down through generations; but at the same time, craftsmen need to innovate, integrate new technologies, work in a more digital way, integrate the green transition and adopt a more design-led approach.

Through its main goals and activity, MOSAIC directly aligns with the values and intentions of various EU policies and initiatives, aimed at fostering skill creation in arts and crafts, such as the ones below.

New European Bauhaus

"The New European Bauhaus initiative connects the European Green Deal to our daily lives and living spaces. It calls on all Europeans to imagine and build together a sustainable and inclusive future that is beautiful for our eyes, minds, and souls."[5]

[4] MOSAIC Erasmus+ Programme Application Form, Technical Description (Part B), p. 15.

[5] https://new-european-bauhaus.europa.eu/

One of the goals of The New European Bauhaus is to bridge between the world of science and technology, art and culture. The New European Bauhaus inspires a movement to facilitate and steer the transformation of our societies along three inseparable values:

- sustainability, e.g. climate goals, circularity, zero pollution, biodiversity
- aesthetics, e.g. quality of experience and style beyond functionality
- inclusion, e.g. valuing diversity, securing accessibility, affordability

The New European Bauhaus' intention is to bring citizens, experts, businesses, and institutions together 'to reimagine sustainable living in Europe and beyond'.

Various inspiring projects and ideas have been conducted within the New European Bauhaus.[6] There are several projects and ideas related to education in arts and crafts. However, at the time of writing this report, we have recognised no projects specifically related to skills gaps in arts and crafts.

Pact for Skills

The 'Pact for Skills' idea has been launched by the Osnabrück Declaration[7]. The MOSAIC project is fully embracing the Pact that invites all kinds of organisations to join forces and take concrete action to upskill and reskill people in Europe. The composition of the MOSAIC partnership reflects this principle by bringing together schools, higher education institutions and business actors. This is also remarked by the Bruges Communiqué[8], which demands VET providers to collaborate with innovative enterprises, design centres, the cultural sector, and higher education institutions in forming 'knowledge partnerships'. Through this project, major VET actors of the arts and crafts sector have come together to co-build a transnational cooperation platform of Centres of Vocational Excellence.

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[6] *Inspiring projects and ideas*. (n.d.). Retrieved 24 August 2023, from https://new-european-bauhaus.europa.eu/get-inspired/inspiring-projects-and-ideas_en

[7] *Osnabruck declaration 2020: On vocational education and training as an enabler of recovery and just transitions to digital and green economies*. (2021, March 4). CEDEFOP. https://www.cedefop.europa.eu/en/content/osnabruck-declaration-2020-vocational-education-and-training-enabler-recovery-and-just-transitions

[8] *The Bruges Communiqué*. (2014, November 1). CEDEFOP. https://www.cedefop.europa.eu/en/content/bruges-communique

The ‘Pact for Skills’ charter brilliantly summarises the key aspects outlined by four strategic documents of the EU: 1) the European Skills Agenda[9]; 2) the European Industrial Strategy[10]; 3) the Digital Education Action Plan 2021–2027[11] and 4) the European Green Deal[12]. MOSAIC addresses all of the four key aspects outlined by the ‘Pact for Skills’ by:

1) Promoting a culture of lifelong learning for all: the project activities involve both learners and professionals. Learners will of course be at the centre of attention, they will be young people attending courses for a qualification at level EQF 3, 4, 5 and 6. However, MOSAIC will also include training activities for professionals in order to upskill them. Firstly, teachers will receive a new package of tools to deal with the modernisation of education in arts and craft, secondly professionals from companies will be given a chance to upskill through training programmes in other countries.

2) Building strong skills partnerships: this principle is already well reflected by the composition of the MOSAIC consortium, bringing together different actors. Furthermore, the impact and sustainability activity strongly focuses on building local networks of stakeholders and engages them on a feedback loop with online and offline meetings to increase their pro-active participation.

3) Monitoring skills supply/demand and anticipating skills needs: the first phase of the project consists of mapping the skills needs of companies. This has been done through thorough research in all partner countries. Moreover, in order to ensure sustainability and have a constant feed from companies, the project will establish an online European

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[9] *European Skills Agenda—Employment, Social Affairs & Inclusion—European Commission*. (n.d.). Retrieved 22 August 2023, from https://ec.europa.eu/social/main.jsp?catId=1223&langId=en

[10] *European industrial strategy*. (n.d.). Retrieved 22 August 2023, from https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy_en

[11] *Digital Education Action Plan (2021-2027) | European Education Area*. (n.d.). Retrieved 22 August 2023, from https://education.ec.europa.eu/focus-topics/digital-education/action-plan

[12] *A European Green Deal*. (2021, July 14). https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

Observatory for arts and crafts, through which it will be possible to monitor the skills gap on a regular basis (annually or every two years).

4) Working against discrimination and for gender equality and equal opportunities: in accordance with the Charter of Fundamental Rights of the European Union, a special attention is paid by the project to young people with fewer opportunities such as: disabilities; special educational needs; and risk of marginalisation due to ethnic background. Practical jobs in the fields of Arts & Crafts are particularly suited to young people with such difficulties because they provide a context where such obstacles can be overcome through practical tasks, where the individual can express creativity without any constraint. The research phase at the beginning of the project analyses which of the final occupations can be particularly suited to individuals with fewer opportunities with the help of companies. Subsequently a training module for teachers will provide them with the tools and techniques needed to deliver personalised learning.

European Year of Skills

The European Year of Skills addresses skills gaps in the European Union and boosts the EU skills strategy, which will help reskill people with the focus on digital and green technology skills. This requires helping people get the right skills for quality jobs and helping companies, in particular small and medium enterprises by highlighting national efforts as well as existing and new EU initiatives and EU funding possibilities. It will support skills-related activities and events across Europe.[13] Main objectives of the European Year of Skills are:

- Promoting investment in training and upskilling, enabling people stay in their jobs or find new ones
- Ensuring skills match the needs of employers, by closely cooperating with social partners and companies
- Matching people's aspirations and skill sets with opportunities on the job market, especially for the green and digital transitions and the economic recovery
- Attracting people from outside the EU with the skills needed

[13] *European Year of Skills*. (n.d.). Retrieved 22 August 2023, from https://year-of-skills.europa.eu/

European Artistic Crafts Days

European Artistic Crafts Days (EACD)[14] are an annual event and they have become the first international event dedicated to artistic crafts and living heritage. The EACD presents arts and crafts in our daily life, in interiors as well as outdoors. For example, craft studios open their doors to the public and outdoor demonstrations are held by craftspeople, training schools and museums. The EACD are organised by local entities, coordinating institutions and organisations, chambers of commerce, crafts chambers, municipalities, etc. 24 countries were involved in the 2023 EACD.

European Training Foundation

The European Training Foundation (ETF) recently stressed the importance of craft in society and communities. Craft is associated with excellence; it is an important feature for future generations. Craft is related to how young people are developing – they are making meaning through craft. Craft is skilling the younger generation. For future policies, it is important to look at the data at hand, and develop craft education accordingly. According to ETF, craft is central in telling the story of where our society is.[15]

Methodology

The collection of data on skills gaps in Arts & Crafts relates to the specific object of the MOSAIC project "[t]o increase and improve collaboration between companies, VET centres and higher education institutions, to reach a state of mutual fertilisation".

The short term qualitative and quantitative indicators to measure the expected results as "Establishment of a feedback loop between VET providers and business actors (companies, chambers of commerce, etc.) to collect data on skills gaps in Arts & Crafts"; while the second set will measure the long-term impact, qualitative/quantitative indicators.

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[14] *Les Journées des Métiers d'Art (JEMA) = European Artistic Crafts Days (EACD)*. (n.d.). Journées Européennes des Métiers d'Art - JEMA. Retrieved 22 August 2023, from https://www.journeesdesmetiersdart.fr/europe/

[15] Prina, M. (2023). *Introduction*. *WCCE Annual Conference 2023 | CRAFTING THE FUTURE: New Skills & Opportunities for Crafts, 20.7.2023*. University of Malta. https://www.youtube.com/watch?v=7hWN7Rw3Nls

Qualitative and quantitative indicators regarding collection of data on skills gaps in Arts & Crafts were given in the Programme Application Form. The excerpt of the qualitative and quantitative indicators table below shows the quality indicators for the project's expected results regarding the collection of data on skills gaps in Arts & Crafts.[16]

Specific objectives	Expected results	Qualitative/Quantitative Indicators
1. To increase and improve collaboration between companies, VET centres and higher education institutions, to reach a state of mutual fertilisation	1.2 – Establishment of a feedback loop between VET providers and business actors (companies, chambers of commerce, etc.) to collect data on skills gaps in Arts & Crafts	— 300 answers collected from companies for the skills gaps analysis — 20 companies participating in focus groups for the skills gap analysis

Table 1. Excerpt of the qualitative and quantitative indicators table below shows the quality indicators for the project's expected results regarding the collection of data on skills gaps in Arts & Crafts.

To reach the expected results, the skills gaps analysis in arts and crafts comprised three tasks: questionnaire, focus groups, and analysis of the results. The tasks are given in the table below.

Task No	Task Name	Description
T3.1	Development and delivery of **questionnaires** for companies, based on the Excelsior survey, with focuses on skills gaps, sustainability and social inclusion questionnaires for companies	Definition of questions to be included in the questionnaires and focus groups for the skill gap analysis which will be sent online. It includes the translation in each language of the partnership. Questionnaires will focus on the skills of the future, including digital and environmental skills and the elements to foster the employment of young people with special needs.
T3.2	**Focus groups** with EU companies, with focuses on skills gaps, sustainability and social inclusion	Arrangement of focus groups in each country to have direct feedback from business actors on the skill needs

[16] MOSAIC Erasmus+ Programme Application Form, Technical Description (Part B), pp. 30–31.

T3.3	**Analysis of the results** and drafting of the skills gap analysis	Collection of data from questionnaires and focus groups and production of publication presenting all the elements emerged from the field research

Table 2. The tasks in the skills gap analysis.

All partners participated in the first task (T3.1). Hence all partners were able to pronounce their needs. The remaining two tasks involved part of the project partners.

Questionnaire

Methodological framework

The Excelsior survey represented the point of departure for the construction of the MOSAIC questionnaire. The Excelsior Information System[17] is one of the most important sources of information available in Italy on the labour market that scopes training needs. It is included among the mandatory surveys sent to Italian companies which are part of the National Statistical Programme. The Excelsior questionnaire comprises of the following sections in 2022[18]

- Estimated employment as 31 December 2021 and production performance forecast
- Activations of contracts and/or possible terminations in forecast quarter
- Incoming professional figures from Month 1 to Month 3 in 2022
- Information on personnel recruitment channels
- Staff training in 2021 and outlook for 2022
- Workers with an apprenticeship/stage contract

[17] Excelsior feeds a database on the professional needs of businesses, which can be used through search and query methods. The data can be browsed by: professional figures, levels of classification, educational qualifications, age groups, sectors of activity, company size and territorial levels. Excelsior is a primary source of information on the Italian labour market and a useful tool for facilitating: the matching of labour supply and demand, career guidance and dialogue between the world of work and the training system. This important tool has been developed in Italy by the national Unioncamere and it has been co-financed by the European Social Fund. See https://excelsior.unioncamere.net/

[18] Translated from Italian: https://excelsior.unioncamere.net/sites/default/files/documenti/Schema_questionario_Excelsior_2022.pdf

· Other information

The first version of the MOSAIC questionnaire for crafts companies was finalised in autumn 2022. Chambers of crafts and commerce had the important role of translating companies' vision into the questionnaire structure. In the next phase, the questionnaire was submitted to all partners. Received comments and feedback contributed to the final design of the questionnaire that reflects all partners' opinions and answers to the project's needs.

During the design phase we noticed that the questionnaire reached 71 questions, which means it was too elaborate to be filled in by companies that typically have quite limited time to reply to surveys. Therefore the questionnaire was focussed on skills gaps, and the questionnaire was re-designed to encompass 16 questions. Questions that repeated the same aspects were combined and elucidated. Also, many questions were reformulated to achieve consistency, comprehension and ethic principles.

The final MOSAIC questionnaire for companies consisted of a three-fold structure. Sustainability, entrepreneurship, digitalisation and inclusion formed a first level of enquiry, where the purpose was to assess the specific needs determined by these 4 core impact factors. The second level of analysis enquired about the knowhow needed at the moment in terms of types of skills (we developed a classification of skills about which we talk more in the next section). Finally, we looked at the micro-level of the enterprise to evaluate working life skills across production/design, production management, marketing and administration. For more details, the final Survey for Companies is available in Appendix 1.

Skills classification

The MOSAIC questionnaire relies on a specific classification of skills that differs from existing frameworks. For example, the Eurofund's Job Monitor provides a mechanism to determine skill gaps that identified 4 abilities required in the handicrafts and printing sector: routine, creativity, resolution and autonomy[19]. These were defined based on a new set of task indices, meant to measure task content (what people do at work) and task methods/tools (how work is organised). Over 30 indicators were developed to measure task contents across three dimensions (physical, intellectual and social). On the other hand, methods/tools were divided in two areas - work organisation and technology (Table 3). In addition to identifying specific skill needs, the study highlighted the necessity for a deeper understanding of the distribution of tasks in occupations and industries in order to set policy priorities for skills and training needs.

[19] https://www.cedefop.europa.eu/en/blog-articles/same-job-different-tasks

Content	Tools and methods
Physical tasks (physical manipulation and transformation of material things): *Strength* *Dexterity*	Methods (forms of work organisation): *Autonomy* *Teamwork* *Routine*
Intellectual tasks (manipulating and transforming information and the active resolution of complex problems): *Information processing: literacy, numeracy* *Problem solving: information gathering and evaluation, creativity and resolution*	Tools (type of technology used at work): *Machines* *Information and communication technologies*
Social tasks (interaction with other people): *Serving/attending* *Teaching* *Selling/influencing* *Managing/coordinating*	

Table 3: A classification of tasks according to content and methods. Source: Eurofund

Based on the identified research needs, we have built the MOSAIC questionnaire in a focussed way, paying attention to the distribution of tasks performed across core business areas (e.g. production, management, administration and marketing). More specifically, through the questionnaire we investigated the skill gaps resulting from the mismatch between vocational education and real working life conditions. In doing so, we developed an approach to skills classification that met the needs of MOSAIC partners, instead of adopting pre-existing categories such as physical, intellectual and social skills. As a result, we differentiated between: manual/craft skills, planning/design, entrepreneurial attitude, digital skills, automation/robotic skills, social and working life skills and skills facilitating the understanding of sustainable production. This decision was taken based on the acknowledgement that professionals increasingly face the need to perform complex tasks, where it is not easy to separate physical, intellectual and social skills from one another, because they all contribute to performing necessary phases of work. The same holds true for methods and tools, which are being increasingly embedded in work processes and form complex ranges of abilities. The distinction we made among skills is thus based on their provisional outcome or functionality, rather than on the level at which they are taking place (physical, cognitive or social). The set of skills was tested against core company domains (Figure 1). In addition, we also tested the specific needs fostered by contemporary factors and trends such as: digitalisation, sustainability and entrepreneurship.

TYPE OF SKILL	Manual skills	Planning & design skills	Entrepreneurial attitude	Digital skills	Automation & robotic skills	Social & working life skills	Skills for understanding sustainable production
BUSINESS AREA	Marketing Production Administration Management						

Figure 1: The classification of skills developed by MOSAIC.

Methodological challenges

290 replies were collected from MOSAIC partner countries between November 2022 and February 2023. The questionnaire structure was designed to meet the real needs of MOSAIC partner countries, instead of adopting an existing template/format. However, this created several challenges:

1. Methodological bias. Some respondents, such as freelancers and sole traders could not identify themselves with all of the questions. To this purpose focus groups were much more targeted at addressing the identified issue, by interrogating respondents only about those areas which are relevant for them and not all of them.
2. Representativity and statistical challenges. Representativity of results in statistical terms was a challenge during the analysis, because of the considerable size difference between MOSAIC countries. If for countries like Bulgaria and Armenia, a sample size of 40 respondents could be valued as sufficient, for countries like France and Italy this is not the case.
3. Non-homogenous vision of explored topics and concepts. The questionnaire was difficult to implement because it gathered different partner visions, which by no means represented equivalent understandings of core concepts and ideas.
4. Length & format. The structured questionnaire enabled the collection of quantitative data that could not provide clear explanations or motivations behind specific perceptions of skill needs.

After the questionnaire, 6 focus groups were organised in MOSAIC partner countries. This form of investigation enabled the collection of qualitative data that complemented and integrated the findings of the questionnaire. Notwithstanding existing biases, the study obtained scientifically sound results.

Focus Groups

Methodological framework

Focus groups are qualitative research tools, aimed at collecting in-depth information about the specific topic through the involvement of participants who are expert or have an important stake in the analysed thematic. The 6 MOSAIC focus groups organised in May 2023, were targeted at complementing the results of the questionnaire, by investigating in-depth the skills needed of arts and crafts businesses in partner countries. The orientation of the investigation is prospective, meaning that potential skill needs were scoped out. This was possible only through deploying focus groups as a methodology, where participants could freely express their beliefs, feelings, attitudes and experiences in relation to perceived skill needs emerging in their business.

Each country carried out a focus group, in the following chronological order: France (05/16/2023), Bulgaria (05/22/2023), Italy (05/24/2023), Finland (05/25/2023), Armenia (05/26/2023), Canada (06/01/2023). The focus groups took place over two weeks (16 days), each country deciding the day to run the event. The same six questions punctuated the study, around the theme of "companies' skills needs". These were organised in two parts. An initial part established common ground between different understandings of craft skills that circulate among participants. This proves fundamental in the context in which the idea of skills can allude to different aspects - mental, physical or tacit abilities - and each culture can interpret them in their very own way. Also in the first part of the focus group, participants were asked about their experience with regard to the evolution of craft skills over time and were confronted with the selection of core topics or factors driving skill needs in the future. To answer the first three questions, participating companies had to consider the "implicit" and "explicit" parameters of skills. The second part of the focus group tapped deeper into the present and future difficulties identified by participants in covering skill needs, as well as into the assessment of formally and informally acquired skills. For the last three questions, they had to interact with the thematic axes guiding the project, i.e. "sustainability", "social inclusion", "digitalization", "research and development", "new business models". The full structure of the focus group is available in Appendix 2.

Methodological challenges

Due to the need of delegating the organisation of focus groups to non-researchers, a rigorous methodological approach was set up, in order to ensure scientific validity and the expected quality of results. This approach included written guidelines and a preliminary training session that enabled moderators to acquire the skills needed for conducting the focus group in their own country. The guidelines also provided specifications and formats for

presenting the transcription of focus groups. Modalities for conducting the focus groups varied from country to country Firstly, the choice of videoconference format (Canada, Italy, Finland) or face-to-face format (Armenia, Bulgaria, France). According to various hazards and constraints, focus groups in each country brought together between 4 and 8 participants. In total, 36 companies took part in the focus groups. Therefore a challenge was to leverage the results generated through different methods of conducting research, in order to make them comparable. To this end the guidelines for how to transcribe focus group recordings were fundamental. Transcriptions were translated from the original language into English by partners, to ensure that the original sense and understanding of vocabulary is not distorted. Despite these measures, we acknowledge that a small loss of nuance in meaning is unavoidable through translation. Each focus group had two moderators (representatives/staff of partner institutions), both representing non-researchers.

In selecting the study sample, variations in three parameters were desired in order to explore as many points of view as possible, as the craft sector is characterised by the diversity of its companies and practitioners: field of activity, company size, and age. Age corresponds to the number of years of seniority, which we have defined in three categories: less than 10 years, between 10 and 30 years, more than 30 years. Company size corresponds to the number of employees involved in running the business. Four categories have been defined, according to the European Commission's "company size" glossary[20]: "micro" between 1 and 10 employees, "small" between 10 and 49 employees, "medium" between 50 and 249 employees, "large" for more than 250 employees. For the field of activity, we suggested to our partners that they open up to professions other than those listed in the MOSAIC project. We noted the absence of large companies (over 250 employees) in the focus groups and a large share of self-employed businesses (58% of participants). We also noted a homogeneity in the seniority levels of participating companies, defined by three age groups - 12 companies under 10 years old, 14 companies between 10 and 30 years old and 10 companies over 30 years old. A variety of sub-sectors are represented by businesses - ceramics (5), glass (1), graphics (6), interior design (3), jewellery (4), leather (1), metal (3), textile (2), wood (11). This composition highlights the predominance of wood companies - approx. 30% of total companies. Last but not least, the manners of managing and conducting the focus group (e.g personal style of moderators, interaction levels with participants etc) determined the length of transcripts and the form of language (formal/informal). For example, in Italy and Bulgaria the length of the transcription of the focus group is 2 times shorter than the one in France. Armenia, Canada, Finland and France have the same amount, even if their number of participants is different.

[20] European Commission. (2016). *Glossary:Enterprise size*. Eurostat Statistics Explained. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Enterprise_size ISSN2443-8219

Analysis of results

Two distinct and parallel processes of data analysis were conducted on the questionnaire and focus group results, each characterised by specific methodological approaches. The findings obtained this way were compared and integrated for consistency.

1. Statistical analysis

The 290 replies to the questionnaire were gathered into an excel database that was cleaned for analysis. The quantitative nature of results required the application of statistical analysis. The purpose of statistics is to take raw quantitative data and find correlations between variables in order to find patterns and trends. In our case, we looked for trends and patterns regarding the skills of employees required by companies.

In the questionnaire, the term *skills* is sometimes used as a composite term to broadly describe observed or theorised imbalances between workers' preparation and ability and the demands of the job (e.g. employers report being unable to find the skills they need). It can refer to the knowledge, skills, competencies and even abilities possessed by workers. Discourse on skills gaps often focuses on the adequacy of the knowledge and skills of current or future workers. There are no universally accepted definitions of these terms. There is, however, some consistency in the components of the descriptions of knowledge and skills provided by many sources:

- Knowledge can be seen as the mastery of facts, concepts, theories and principles, or a theoretical or practical understanding of disciplines, subjects, processes or technical equipment;
- Skills can be seen as the ability to do something, such as mathematical calculations, reading, writing, research or critical thinking.

Based on the approach of the concept of skills, statistical analysis was conducted in two steps. The first step was exploratory, aimed at crossing all variables to identify patterns. In a second stage, we performed a targeted analysis on trends around skill needs. These were driven by theoretical implications, stemming from the distinction made in the questionnaire between:

Question 7-10: assessment of the skills gaps in the various departments of the company (state of readiness of employees in relation to the real needs of the working environment)

Question 11-13 & 16: assessment of the importance that companies attribute to specific skills in the areas of sustainability, entrepreneurship, digitisation and inclusion for their business.

Question 14-15: assessment of current and future skills gaps.

The theoretical implications of this division have different outcomes:

Skills gaps (Q7-10) may accentuate the perception of current skills needs (Q14-15). The importance of specific skills to the business (Q11-13) may also explain the criticality of specific skills gaps (Q7-10) recognised by businesses (e.g. a high perceived importance of entrepreneurial skills may determine the need for a more entrepreneurial mindset/attitude). Based on the skill categories tested through the questionnaire, we further verified how the size, sub-sector and geographical outreach of companies determine skill gaps. The following questions were tested:

- Are the skill sets required by international companies different from local ones (local, more manual - vernacular; international, more automated)?
- Do large companies need a wider range of skills than small companies (small manual companies versus large automated companies)?
- Are there statistically significant differences between the needs of the skill groups identified in the different countries?

To explore these questions, we used factor analysis. Factor analysis is a method applied to the values of an initial set of input variables that are known to have mutual correlations in order to find a smaller set of factors that describe the underlying interrelationships and mutual variability. For example, we deployed factor analysis on Questions 7-10 to see if these questions can be expressed through a more reduced number of variables, arriving at a re-definition of typologies of skills. We also applied factor analysis to individual questions (e.g. 14, 15) to find occurrences between variables. The targeted application of statistical analysis enabled us to find the determinants impacting the variation of skill needs, that we explain more in detail in Chapter 3.

2. Coding method

Focus groups are qualitative studies requiring the use of appropriate analytical methodologies. We have borrowed a method specific to the management sciences: coding using a deductive approach, known as top-down[21]. The data is textual, derived from written focus group transcripts, organised by country. Coding is based on categorization and interpretation operations, and the data is broken down into analysis units that we call *extracts*. This methodology leads us to retain the meaning of the data.

[21] Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. sage.

Different categories, which we call *codes*, were defined beforehand to classify the different extracts. These codes are of different nature: they are of a theoretical nature and of an *in vivo nature*, i.e. derived from collected data. We have identified two types of categories: *topics*, i.e. the main themes of the project, i.e. sustainability, social inclusion, research and development, digitalization and business models; and *in vivo codes*, also divided into different themes. We also considered it useful to compare data between these categories, according to the different characteristics of the companies: their country of origin, their age, their size and their field of activity.

Key numbers:

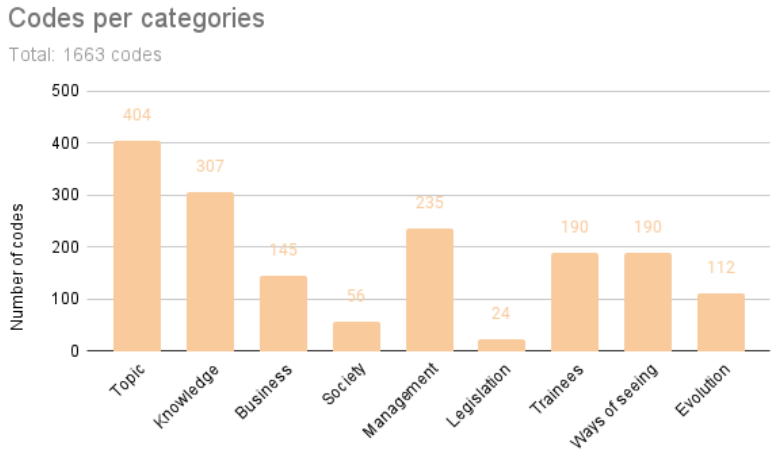
- After the treatment of 511 683 characters, 288 554 characters were retained
- A total of 37 codes (grouped into 9 categories) were identified
- Coding of 360 extracts
- Attribution of 1663 codes for the 360 extracts

When defining the analysis by units, we came to the conclusion that it was impossible to associate a sentence or a short segment of text with a single code. Isolation by single code leads to decontextualization of the meaning of the data, and adds difficulties of interpretation. The analysis units are therefore made up of a set of sentences (paragraphs) of varying lengths, grouping together several codes. They preserve key ideas and are a function of meaning[22]; they are therefore not systematised, the six transcriptions were manually analysed. We therefore proceeded to analyse the links between the categories to facilitate our orientation towards the extracts from the subjects we are interested in. This coding methodology contributes to developing the nature, dimension and relationships of concepts in the form of *codes* (the principle of "open coding"), such as for example *skills*. Appendix 3 shows the list of developed codes.

Each coded extract was then assigned an ID number, in order to better identify and group them for the analysis. Analysis was performed per codes and categories. Annex 4 contains the list of codes and example extracts from the coding process. The analysis was crossed with the companies' features presented in the first part of this document. This point is important because we may, for example, have results with a larger number of data for one sector than for others, but if that sector is already over-represented in the number of participating companies, there is no significant proportional difference. Applying simple statistics (Graph 1) reveals that the most discussed aspects surround the 5 MOSAIC topics (sustainability, inclusion, digitalisation, new business models, R&D), as well as the theme of

[22] Point, S., & Fourboul, C. V. (2006). Le codage à visée théorique. *Recherche et Applications en Marketing (French Edition)*, *21*(4), 61-78.

knowledge and *management*. These categories regard the difficulties, the strategies, the objectives and the risks manifested by focus group participants. In doing so, participants stressed their field experience related to skills and topics, which provided the expected data for the study to meet its primary objectives.



Graph 1. Number of codes by category

Based on the focus group coding, we carried out a more in-depth analysis of the skills discussed by the companies, using the codes: "skills", "learning", "experience", "techniques", "versatile", and "work values". The extracts from these codes were classified according to the MOSAIC skills classification (see Figure 1). We developed a double classification according to the typology of skills expressed by the companies, as some are enhanced by definitions, advice on the conditions for developing certain skills, as well as recommendations in relation to certain skills or context of use of skills (example: specialisation skills facing versatility skills; keep flexibility for malfunctions management).

In this way, we commented on each extract in our database with a single word, sometimes accompanied by brief details. Processing the extracts by hand meant reading and interpreting the meanings attributed to certain skills to provide fine-grained information about them. For example, some companies expressed a need for skills based on experience. But when we looked at the meaning of the extract, "experience" was not always associated with manual or technical skills, and the need for experience was also related to the apprentice's cultural background. So different categories may contain the same skill, but with divergences in their context of application. Each category contains nuances in relation to the original meaning expressed by the focus group participants.

To organise the list of competencies obtained in each category, we used a heuristic diagram. This visualisation tool deploys the skills around each category. We propose sub-categories based on the proximity of the data. These subcategories are therefore *in vivo* by nature, i.e. they have been defined on the basis of field data. Skills expressed repeatedly

and with the same meaning are highlighted by indicators (e.g."x2", "x3", "x6"), depending on the number of times they appear and underlined by the word's font size.

About the report

Following this introduction, we set out the context for conducting skill needs assessment in arts and crafts, building on the latest evidence brought by market studies and research reports. The primary research findings are discussed in sections 3 and 4, each focusing on present, respectively future skill needs. We conclude the report with a section where we draw on the skill gap analysis to make recommendations for future directions in VET training.

2. THE SKILL CHALLENGE

At the EU level, the cultural and creative industries (CCS) account for 413 billion Euros in terms of value added, representing around 5.5% of the total European value added. This makes them one of the most vibrant and dynamic sectors, generating important economic growth and employment, as well as contributing to social cohesion and the promotion of diversity. According to the EU's Single Market Report[23] the economic contribution of the CCS is even greater than that of sectors like telecommunications, pharmaceuticals or the automotive industry. Between 2013 and 2017, the CCS continued to grow at a CAGR of 5.1%, driven by the audio-visual and multimedia sub-sector. Based on Eurostat figures, cultural and creative industries employ 8.7 million people in the EU, equivalent to 3.8% of the total workforce in the EU, representing 1.2 million enterprises. According to the European Union Labour Force survey[24] cultural employment reached 7.7million people in 2022 and continued to grow at a rate of 4.5% compared to the previous year. Furthermore, there are important spillover effects from the CCS on other sectors, such as cultural tourism and digital services for music, film and video games. In specific the arts and crafts sub-sector plays a key role in the development of cultural tourism, through offers that leverage on the innovative potential of cultural heritage. However, mapping the arts and crafts field is complex, due to several factors.

Crafts is characterised by the application of haptic skills and manually controlled tools[25]. Its position varies according to frameworks and definitions, which are different from country to country. Most often than not, craft is grouped together with arts and design. For example, the UNESCO Framework for Cultural Statistics (2009) lists together visual arts and crafts as one of the six cultural domains and the European Statistical System Network on Culture (ESSnet-Culture 2012) lists 'Arts Crafts' as one of the 10 cultural domains. Despite the different forms of clustering, a distinction between traditional crafts (using inherited techniques and values authenticity) and contemporary crafts (drawing on original designs and values artistic intervention) is more widely adopted. This separates more conventional configurations of crafts (e.g. traditional and industrialised craft) from contemporaneous configurations (e.g. technical, pure, and creative craft) and also determines distinct work

[23] https://commission.europa.eu/system/files/2021-05/swd-annual-single-market-report-2021_en.pdf

[24] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Culture_statistics_-_cultural_employment

[25] Jennings, H. 2012. Towards a Definition of Heritage Craft. London: National skills academy.

skills and attitudes[26] (e.g. mastery of technique, all-roundedness, embodied expertise and contextual knowledge, dedication, communality, exploration). Nevertheless, geographical and local specificities often make it difficult to fit different crafts into pre-established categories. Therefore, the European Commission has established that craft businesses continue to be defined at national level, based on their specificity and specialities. The resulting heterogeneity of the sector - each country has its own coding systems such as SIC, NAICS, NACE - renders a comparison of indicators and variables, including a coordinated mapping of skills needs, of the sector difficult to undertake. In addition, more and more activities of craftspeople fall outside definitions of existing classification codes, which complicates their classification and mapping. To this, we can add the high number of sole traders and freelancers that make up the crafts market, for which it is difficult to create an effective legal framework[27].

All these factors show the complexity of mapping both the economic value and the needs of the arts and crafts industry. To address this issue, a large-scale study was commissioned by the EU in 2022 entitled "Measuring the CCS in the EU"[28]. The report resulted in a new framework for CCS statistics that embeds new methods for capturing and quantifying online services in the CCS, which is expected to facilitate mapping and create more cohesive and coherent measuring systems. While such instruments and frameworks aim to produce a more accurate measurement of the cultural and creative industries' contribution to the EU economy, they require time and collective efforts to yield expected results.

In order to keep sustaining the growth of the CCS, skills are fundamental, as they underpin productivity and innovation. It thus becomes essential to understand the needs in terms of skills and the existing gaps and challenges which might hamper the future growth of the industry. However, as seen above, it is not easy to set up a cohesive and holistic strategy for mapping the arts and crafts industry, which is a specific part of the CCS. The approach which lies closest to this kind of mapping was undertaken by the European Commission (EC) in relation to the handicrafts and printing sector. According to the EC, "handicraft and printing workers use high-level technical skills to apply both traditional and contemporary methods in the design and production of jewellery, pottery, or textiles, along with many other articles". Furthermore, it is stated that "workers in this occupation combine artistic and

[26] Kroezen, J., Ravasi, D., Sasaki, I., Żebrowska, M., & Suddaby, R. (2021). Configurations of craft: Alternative models for organizing work. *Academy of management annals*, *15*(2), 502-536.

[27] Ref to our new business models report (MOSAIC)

[28] https://www.measuring-ccs.eu/wp-content/uploads/2022/11/The-Measuring-CCS-Consortium-publishes-the-Final-Report-Measuring-the-Cultural-and-Creative-Sectors-in-the-EU.pdf

manual skills to design, produce, maintain and decorate a range of goods, from precision instruments to jewellery and pottery ware and printed products. Their work may be carried out by hand or involve the use of hand tools and hand-held power tools (and sometimes the set-up and operation of machinery and machine tools). Relevant jobs are, for example, musical instrument makers and tuners, potters, sign writers, engravers and etchers, glass makers, print finishing and binding workers, print workers, and jewellers". The study estimated that between 2006 and 2018, employment in handicrafts and printing fell by 29% from 1.7million to 1.2million[29]. This downward trend is expected to continue, falling by 5% between 2018 and 2030 (~61,000 lost jobs). The most affected areas are expected to be wood, paper, print, rubber, mineral and retail. Despite the lost jobs, 546,000 new positions are expected to require new specialists in handicrafts. These market dynamics are rapidly shaping the type of skills needed to cover job opportunities. More specifically, five drivers of change have been identified by EC studies that are likely to shape the need for skills in handicraft and printing. Most of these factors form the core of the MOSAIC research (some of them were defined in more holistic/general terms).

First, environmental sustainability is expected to drive new production and marketing practices, where values of durability and environmental care need to be embedded throughout the entire creation process. This area is one of the impact domains covered by MOSAIC. The changing nature of employment, in the form of more flexible working hours, is the second factor likely to determine a shift towards portfolio working and away from fulltime working hours. For MOSAIC, we defined this domain as new social and business models. We also covered within this area the growing use of social media tools that is likely to influence the way in which professionals interact with customers and market their products. Thirdly, emerging technologies are expected to be increasingly adopted inside production, augmenting the need for technical skills as well as adapting to quick technological developments. For MOSAIC, we looked at digitalisation as the broader field encompassing technological impact. Last but not least, the need for bespoke and personalised products is foreseen to drive the need for cross-disciplinary competencies as well as soft skills like flexibility and resilience. Inside MOSAIC we addressed this aspect under the topic of research & development, which looks at how innovation takes place through systematic exploration and cross-disciplinary actions. A last impact area considered by MOSAIC, which was not highlighted in the EC study on handicraft skills, is represented by the topic of social inclusion. In fact, creating a more diverse, equal and fair sector, while reducing the gender gap, is fundamental for stimulating the further growth of the sector. This requires specific soft skills such as understanding, empathy, open mindedness and flexibility. The fact that in 2021, the European handicraft and printing sector counted with only 35% women

[29] https://www.cedefop.europa.eu/en/data-insights/handicraft-and-printing-workers-skills-opportunities-and-challenges-2019-update#_what_are_the_trends_for_the_future2

highlights the need to prioritise this topic and investigate more closely the type of skills needed to tackle this challenge.

However, evidence suggests that the current workforce is failing to adapt and respond to these shifts, resulting in the emergence of specific skill gaps. In terms of innovation skills, for example, these are still mainly focussed on actions targeting technical improvement of production processes and the expansion of sales channels[30]. Truly transformative innovation taking place through research and development skills is still not predominant in the sector. The same is true for the lack of digital capacity of the sector[31], which is part of a larger concern affecting the whole CCS[32]. Moreover, among the most requested skills in online jobs identified by the EC study on the handicrafts and printing sector are business and administration skills, followed by technical skills (e.g. engineering), indicating these as priority areas. Entrepreneurial skills, in specific those related to management and technical skills[33]that are essential for the sustainability and growth of any business, remain highly important in crafts as well as the broader CCS sector, both characterised by a high self-employment rate.

Moreover, the current education landscape does not provide encouraging figures. The EC reporting of the handicraft and printing sector shows that although the qualifications profile of the sector has been increasing, it is estimated that 29% of employees in this sector are still possessing a low level of qualifications. This is expected to improve only slightly, reaching 25%. The share of qualified workers on the other hand is expected to grow from 14% to 21%. As future job openings are expected to call for medium and highly qualified professionals (the EC study estimates that over 96% of jobs are expected to fall within the medium to high qualification profile range), it is fundamental to improve the training offer. In order to do this, a thorough mapping of the skill gaps can provide important empirical evidence on how to build effective training programmes.

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[30] https://www.craftingeurope.com/wp-content/uploads/2022/11/European-Craft-Sector-report_FINAL.pdf

[31] ibid.

[32] Warwick Commission (2015). *Enriching Britain: culture, creativity and growth*. Warwick: The Warwick Commission Report on the Future of Cultural Value.

[33] https://www.oecd-ilibrary.org/docserver/1357bbe7-en.pdf?expires=1692709089&id=id&accname=guest&checksum=9AA8FD66793921284D50D8379F65568C

One urgent challenge for the arts and crafts, evidenced by a study conducted in 2018[34], is the lack of generational change. The ageing workforce and the lack of the passage of knowledge and transmission of skills (especially for master crafts) is preoccupying for the future growth of the sector. Referencing again the study conducted by Crafting Europe, we notice that the European craft sector tends to be middle-aged, concentrated in the 40-49 (29.6%) and 50-59 (34.4%) age groups. The largest share of surveyed professionals have been working in the sector for under 10 years, which could be an indication of the fact that the sector has welcomed many people in recent years. Independently of the time worked in the sector, the majority (61.5%) consider that they have or will have problems with generational replacement for their activity. In this context, education appears as a fundamental lever for overcoming this particular challenge. Moreover, considering that an important share of workers in handicrafts and printing come from technical sciences - 35.7% of respondents had a technical background, followed by 25.9% with a background in arts & humanities - we can conclude that vocational education occupies a leading position in addressing the skill gap challenge through an adequate training offer. This is particularly important in a challenging general context, in which the COVID crisis had a major impact on the resilience of the crafts sector and particularly on micro businesses and freelancers[35]. However, in order to best tackle this challenge, we need to identify the specific types of skills and the domains where they are required inside arts and crafts businesses.

[34] Bowes, L. et al. (2018), Skills Needs Assessment for the Creative and Cultural Sector: A Current and Future Outlook, CFE Research, https://www.artscouncil.org.uk/sites/default/files/download-file/SkillsNeedsAssessment.pdf.

[35] Yadav, U.S., Tripathi, R. & Tripathi, M.A. Adverse impact of lockdown during COVID-19 pandemic on micro-small and medium enterprises (Indian handicraft sector): A study on highlighted exit strategies and important determinants. *Futur Bus J* 8, 52 (2022). https://doi.org/10.1186/s43093-022-00166-0

3. CURRENT SKILL NEEDS

Gathered evidence highlights skill gaps in relation to manual, soft and digital skills. This chapter explores these gaps, perceived causes and consequences for businesses and ways in which they need to be addressed, particularly through the lens of vocational education, which prepares generations of future professionals in arts and crafts.

Key insights

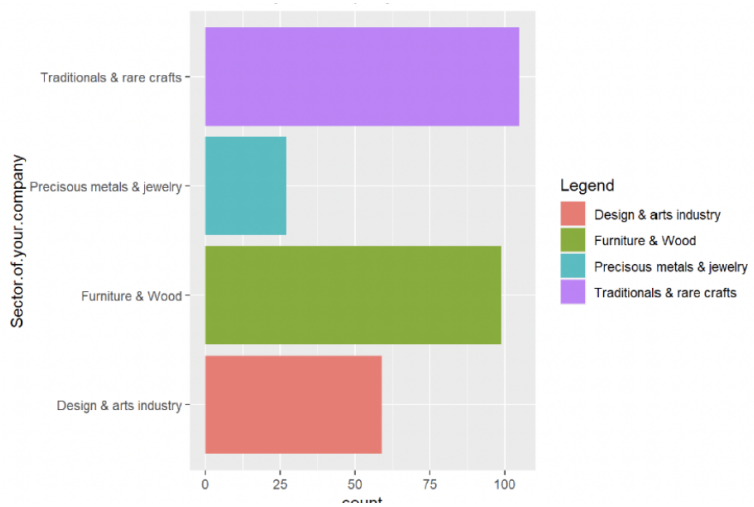
- ***Social inclusion, digitalisation and sustainability*** *are important drivers of skills, each presenting a different level of difficulty in operationalizing specific capabilities*
- ***Soft skills*** *remain among the* ***top skills*** *needed (reported by 68% of questionnaire respondents); however* ***manual*** *skills (reported by 67% of questionnaire respondents) and* ***entrepreneurship*** *skills are also needed, even if less explicitly manifested.*
- *59% of questionnaire respondents report a* ***high need*** *for* ***entrepreneurial skills***
- *Social inclusion is a highly debated area of skills, with most businesses not specifically considering to know more about it or needing to build skills around it*
- *Although 55% of questionnaire respondents value highly the need for* ***green skills*** *across all business operations,* ***sustainability*** *remains a low priority area, mainly due to the* ***difficulties*** *of embedding green practices at all business levels*
- ***Digitalisation*** *remains one of the top drivers of craft skills (61% of questionnaire respondents report a high need for digital skills). However, priority areas depend largely on the* ***size of the business****:* ***marketing & sales*** *is the most invested area for small businesses, while for large businesses digital skills are needed more around* ***production and planning****.*
- ***Entrepreneurial abilities*** *remain fundamental for the thriving of businesses, yet they cannot be limited at understanding the fundamentals of running a business*
- *The concept of* ***new business models*** *is not much deployed within arts & crafts, yet specific* ***soft and technical skills*** *related to entrepreneurial mindsets and new forms of organising businesses represent priority areas for skill development*
- ***Automation & robotic skills*** *are the least needed, most probably reflecting the mistrust and controversial opinions of respondents surrounding a field that is still in its early development*
- *61% of questionnaire respondents estimate that a* ***combination of skills*** *is needed*
- *In line with the evidenced priority areas, we can distinguish the following* ***groups of skills: social and human skills*** *(entrepreneurship, sustainability and social/soft skills),* ***manual skills, automatisation skills and operational skills*** *(conceptualisation, planification and digitalisation skills)*

Skills gaps

Demographic and study-specific acknowledgements

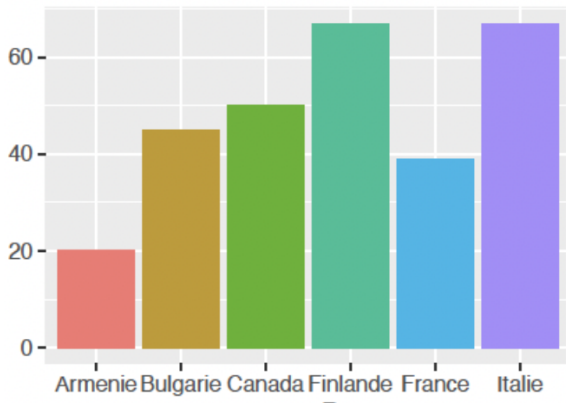
A contextualisation of findings of the questionnaire is important in order to better understand the limits and specificities of the study. The total number of replies and the distribution by country reveals some statistical weaknesses. However, the variety in the size of responding companies and the diversity of sub-sectors is more representative.

In terms of sub-sector, furniture and traditional crafts are best represented (they make of 54% of respondents), while design/art and jewellery are less well represented (jewellery makes up only 9% of total respondents).



Graph 2: Number of respondents by sub-sector

In terms of countries, Armenia is the least represented in terms of responses and Italy/Finland the ones best represented. For France, there were surprisingly less responses received than originally expected (~40).



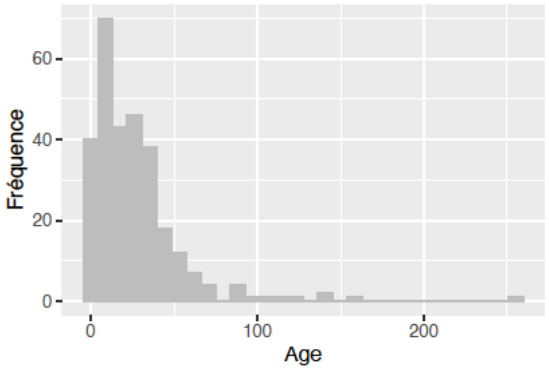
Graph 3: Number of respondents by country

Also at the level of sub-sectors, we can identify important differences between countries. For example, responses from Canada are almost exclusively focussing on the wood sector and represented by an important share of big companies. In Italy on the other hand, responses came mainly from design & arts, with few representation from the jewellery sub-sector. In contrast to Italy, French businesses from design and arts are very few. Most self-employed respondents are from Finland, while in Italy small businesses are highly represented.

Graph 4: Type of respondents by sub-sector

The fact that small companies are mainly coming from traditional and rare crafts while big companies come from the wood sub-sector is important. It indicates that traditional crafts tend to remain niched and produced for a limited/specialist public, while woodwork tends to go more towards mass production.

Moreover, statistical analysis reveals an average age of businesses set at 26 years. A close reading of the histogram reveals that a handful of companies show an atypical age, with lifetimes in excess of 100 years, which explains why the histogram's curve has shifted sharply to the left, driven by the extreme values observed. Knowing that we interpret the skills needs of mature businesses rather than start-ups is important for the study.



Graph 5: Age of respondents

1. Skills gaps by impact area

In the first paragraphs of section 2 of this report, we briefly discussed the five impact areas of craft skills that shape current needs. We further explored the level of importance of these areas for businesses through the focus groups. Results show that:

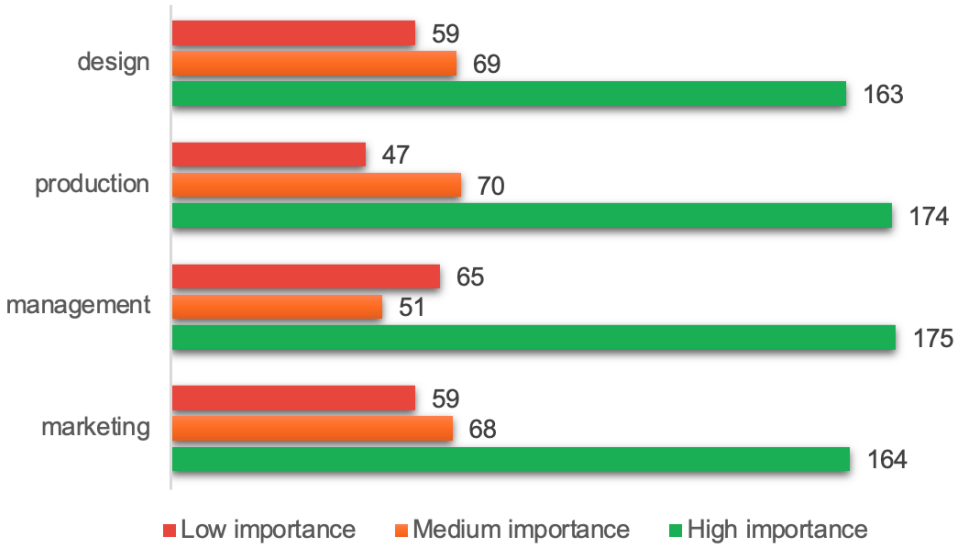
- **Social inclusion** is the most talked-about topic, for all countries, kind of companies (size or seniority) and field of activity. We can nevertheless observe a demarcation from the rest, for France.
- **Digitalisation** is the second most discussed topic. Its histogram is concordant/consistent with the social inclusion topic, except for the ceramics field where digitalization predominates. Compared to micro companies or companies with less than 50 employees where this topic is important too, digitalization is a topic with the same importance as sustainability, R&D and business models for large companies. We stress that little is said about digitalization in the glass field.
- **Sustainability** is the third most discussed topic.
- **R&D** and **new business models** topics are equally discussed, but less than the other topics.

Furthermore, we retrieved more in-depth information about four of these areas[36] through the MOSAIC questionnaire, where we asked respondents to rate the importance and relevance of specific skills in their business falling within these impact areas.

Sustainability

For the area of sustainability, we assessed the specific green skills impacting on different business areas such as design, production, management and marketing. Results show that on average 55% of respondents value highly the need for green skills across all business operations. However, the other half of respondents only assign a low to medium importance to this area, reflecting personal awareness and opinions rather than a unanimous drive to tackle sustainability aspects. Among all business fields, it is in design and marketing that sustainability appears less important, which could reflect the fact that the more 'intangible' nature of sustainability is not well acknowledged, while the more tangible one (production/design) is already addressed. Graph 6 shows the number of respondents assigning a high/medium/low priority to green skills across different company operations.

[36] We do not discuss R&D because it is a task in progress for which we do not have final results yet.

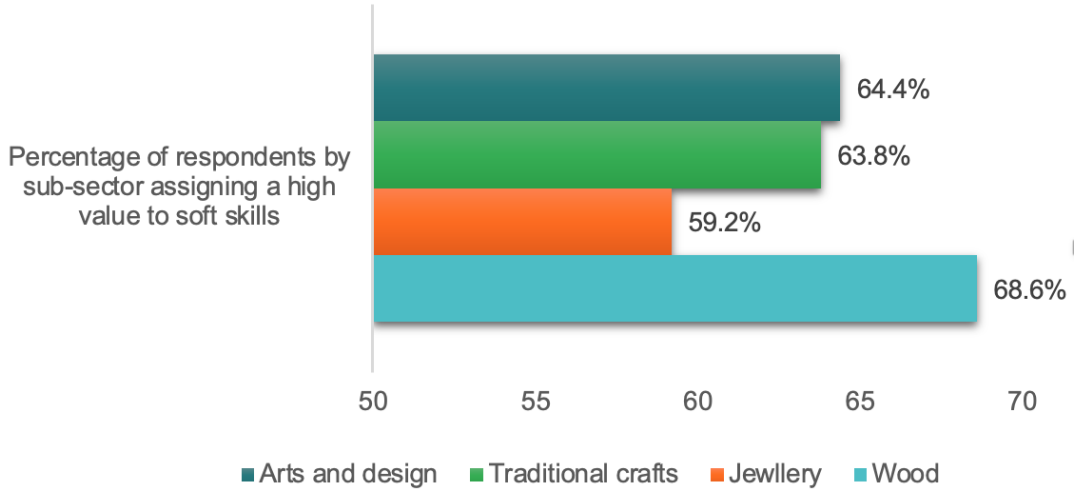


Graph 6: Number of respondents assigning different levels of importance to green skills across business operations.

In Canada, and also Italy to a lesser degree, sustainability inside design/planning is being assigned lower importance by comparison to other countries (e.g. in Finland and France few respondents assign a low importance to the topic). This situation seems to be repeating for production/manufacturing. In Finland and France, respondents assign the most importance to sustainability skills inside administration. All sub-sectors register a high importance of sustainability skills, with traditional crafts leading. However, the sub-sectoral and country-based specificities are not representative from a statistical perspective.

Entrepreneurship

We also evaluated respondents' replies in relation to how much importance they assign to technical vs. soft skills that are fundamental in entrepreneurship. Results show that soft skills are evaluated a little higher in terms of importance, compared to more technical skills such as management, leadership and marketing - 211 respondents rate technical skills high compared to 219 respondents who rate soft skills high. Technical skills are slightly more valued than soft skills across all countries except for Italy where they appear to have a similar value to technical skills. We also note that the smaller the business is, the more it values soft skills higher, reflecting the need for business owners to develop close and personalised customer relationships. Graph 7 shows the % of businesses, grouped by sub-sector, who assign a high value to soft skills.

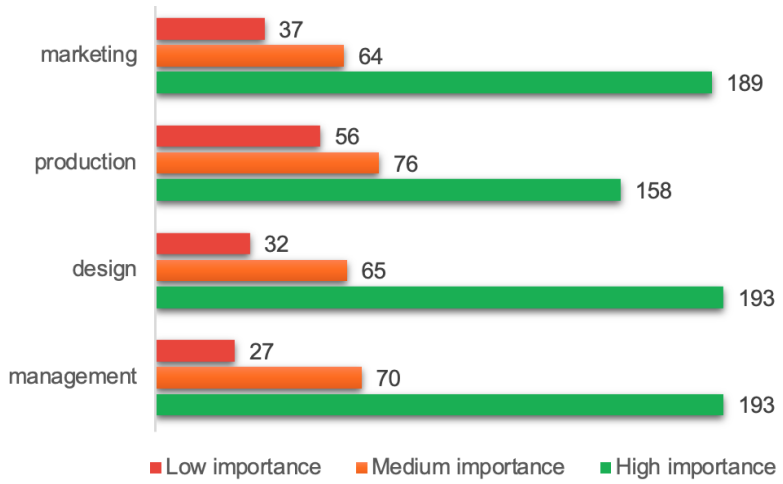


Graph 7: Percentages of businesses grouped by sub-sector, with a high need for soft skills.

Digitalisation

Digitalisation is one of the top drivers of craft skills. In MOSAIC, we assessed the contemporary digital skills needed across different business domains. Results show that the areas of design and management are those with the highest assessment of digital skill, while production is the least concerned by them. In the area of production, there is an average 18% less respondents who highly value digital craft skills, compared to other business domains. This could reflect a low digitalisation degree of production processes, that depicts an image of small businesses that remain rather manual and little focussed on introducing digital processes into production streams.

In terms of sub-sector, digitalisation skills in management and planning are highly important for all sectors, and in particular for wood. In traditional crafts and jewellery, being able to use digital skills as part of marketing and sales is fundamental, reflecting the need to reach customers through targeted strategies. Graph 8 shows the number of respondents and the value they assign to digital skills across different business domains.

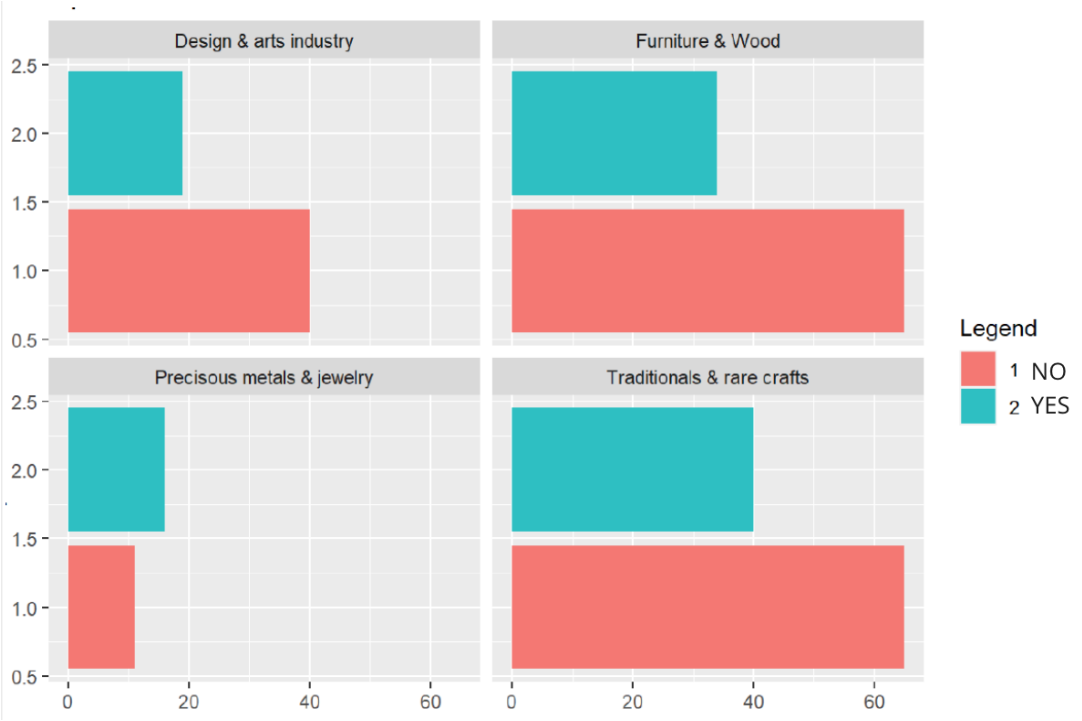


Graph 8: Degree of importance of digital skills assigned by businesses across different business domains.

Social inclusion

The topic of social inclusion is in itself problematic, due to the different understandings that countries possess of this topic. As the analysis shows, there are many differences between countries, in the way in which they consider important different aspects of inclusion. Overall in Italy and France, respondents didn't consider they need to possess more knowledge about inclusive topics, while in Armenia, Finland and Canada they did (Bulgaria is on the edge). On the other hand, legislation and human rights are topics that all companies consider they should know more about. In contrast to other countries, Armenian respondents consider they need to know more about can-do attitude and tolerance. From all respondents, those in France and Armenia believe that they should possess more knowledge about communication.

We can retrieve differences also across sub-sectors. The arts & design sector appears to be the most aware about inclusive topics and the jewellery sector about legal aspects. The wood sector is the least aware about human rights/tolerance aspects and the traditional sub- sector the most aware one. Design & arts is the only sector where companies do not consider they need to be more aware of topics of inclusion. Interestingly, mainly businesses in jewellery believe that staff should be more knowledgeable about tolerance to be more inclusive. Graph 9 shows the share of respondents who consider they need to know more about tolerance compared to those who think they don’t.



Graph 9: share of respondents considering they need to know more about tolerance vs. those who don't .

2. Skill gaps by types of skills

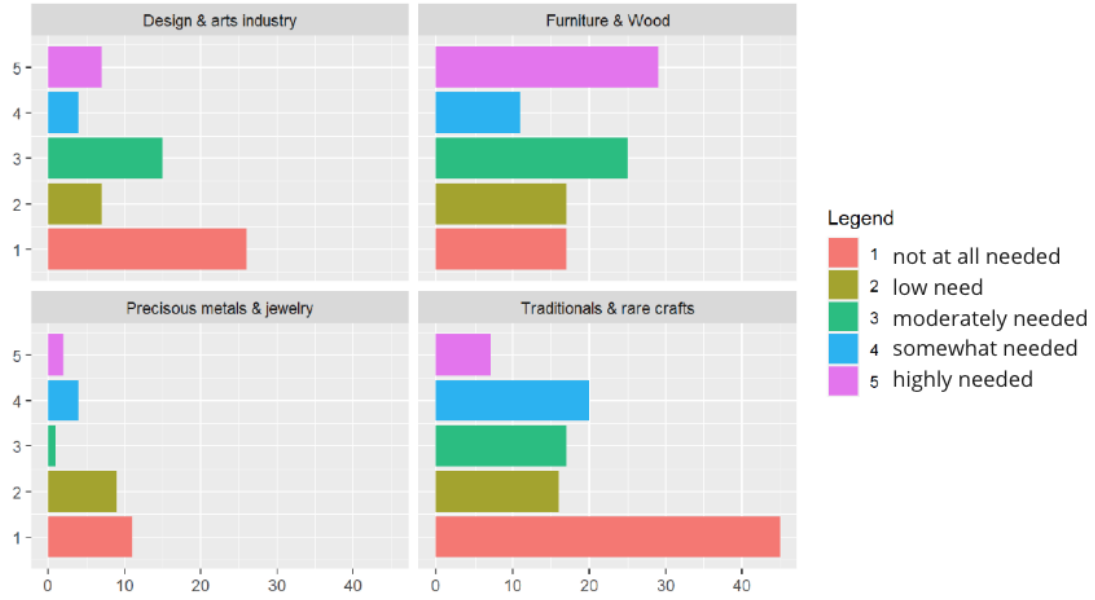
We then looked closer at the importance assigned to different types of skills defined in our framework. This enabled us to assess the degree to which respondents assign value to different categories of skills.

According to the analysis, **automation and robotics** skills are perceived as least needed, which can be attributed to the fact that this field still represents unchartered territory. Artificial intelligence is slowly entering craftsmanship through applications like distant learning and the use of intelligent teaching assistants[37]. However, craftsmanship seems, through the very nature of ancestral tradition which it embeds in its practices, still distant from the advanced and highly automated world of robotics. Moreover, this can be influenced also by each countries' strategy in this pioneering field. For example Canada, which has ambitions of becoming a world leader in robotics[38], appears among other MOSAIC

[37] Sun, L., Tian, J., & Guo, L. (2023, June). The Innovation of Distance Education System of Craftsmanship Based on Artificial Intelligence Technology. In *Proceedings of the 2nd International Conference on Internet Technology and Educational Informatization, ITEI 2022, December 23-25, 2022, Harbin, China*.

[38] https://www.canada.ca/en/innovation-science-economic-development/news/2020/12/government-of-canada-announces-contribution-to-next-generation-robotic-warehouse-solution.html

partner countries as the one with the highest interest in automation skills. Also in terms of sub-sector we notice differences. For example traditional crafts have the least need for automation, followed by arts & design and jewellery. On the other hand, the wood sub-sector evidenced a higher need for automation, which reflects the results obtained in Canada, from where the majority of wood business comes from (Graph 10).



Graph 10: Perceived need for automation skills based on sub-sector

The debate about robotics and AI is a complex and controversial one, as highlighted also by the focus group findings. On the one hand, automation and AI are seen as being part of the bigger technological shift that has the potential of taking over everything. In this context arts and crafts become the point of resistance against this domination:

"We think that in the world everything is going digital. We are going directly in the opposite direction because we know that every person must go in this direction, every person must develop. Hand work pure without.... as much as we can do without technology it will have more value day by day there will be less in technic...." (ID009).

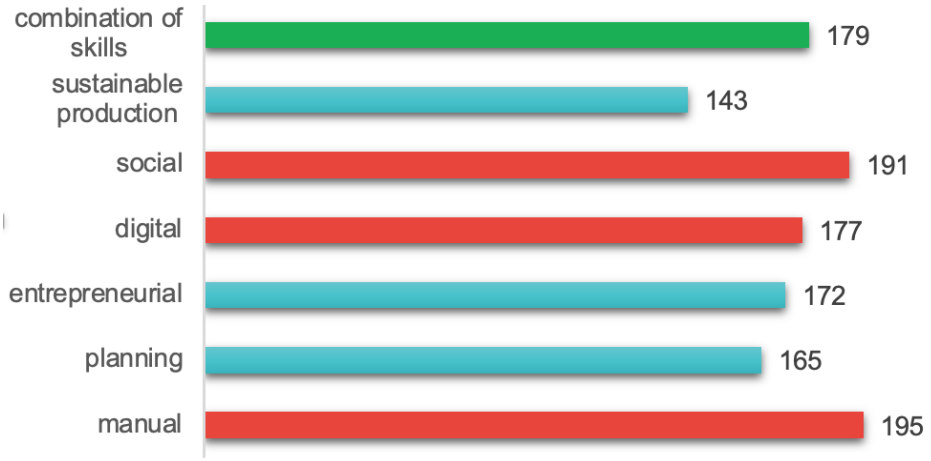
On the other hand, others have already tested these technologies and/or believe this is an inevitable and needed shift:

"I think we absolutely have to go digital. Then, as we said earlier, it wasn't just CNC, I'm thinking about AI. It's something we've never really considered before, but I'm thinking more and more about artificial intelligence, I don't know how it could happen. I think we're in an industry that's behind the times when it comes to all this. It doesn't matter if you're thinking about metal or any other kind of food. That's where we're lagging behind. There is little or no automation. So there's a good gain to be made there, and in productivity too. I think that in Quebec, it's clear that there are productivity gains to be made there". (ID027)

A third type of reflection found in the focus groups is more explorative and tries to mediate between the positive and negative impacts of AI. One of the Armenian focus group participants affirms that:

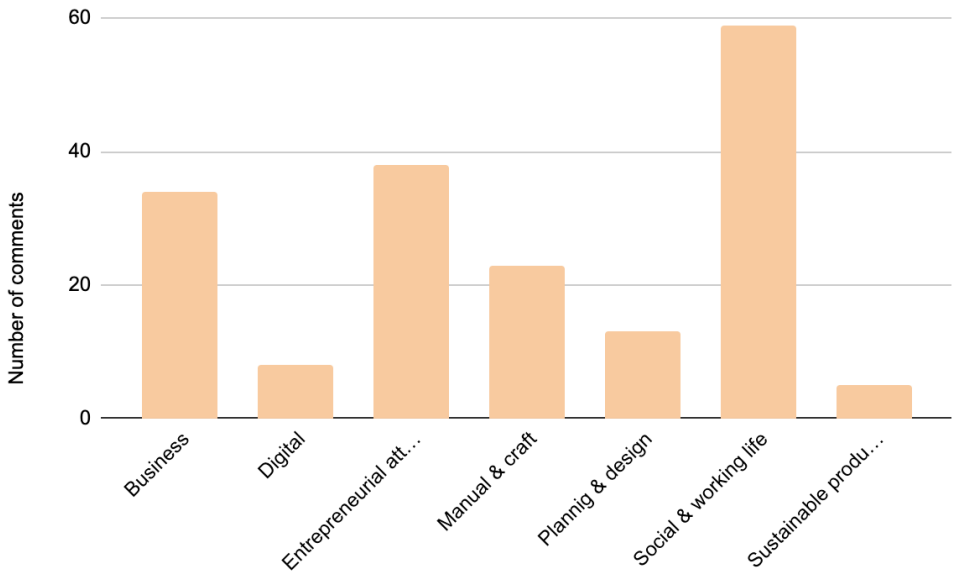
"It should be combined because one cannot exist without the other because if I do handwork, I feel that whatever ideas come to me during that time and you are better the way you create. And when you find out that you give the robot something you don't think about at the time but he can help you a lot. So, if you have a big project, you can do it sooner and with better quality, to some place.... quality in terms of time, because it often happens that you want to reach everywhere but you can't reach physically because you have 2 hands. But it seems to me that having 10 hands helps you. You need to combine something. That's how I work." (ID015)

Except for robotic skills whose situation we explained above, all other skills appear to be quite high on the priority list of companies, without major gaps. Respondents of the questionnaire reported **manual** and **social/working life skills** among the most required ones, followed by **digital skills**. Many also agree that a **combination** of skills is also highly required (Graph 11).



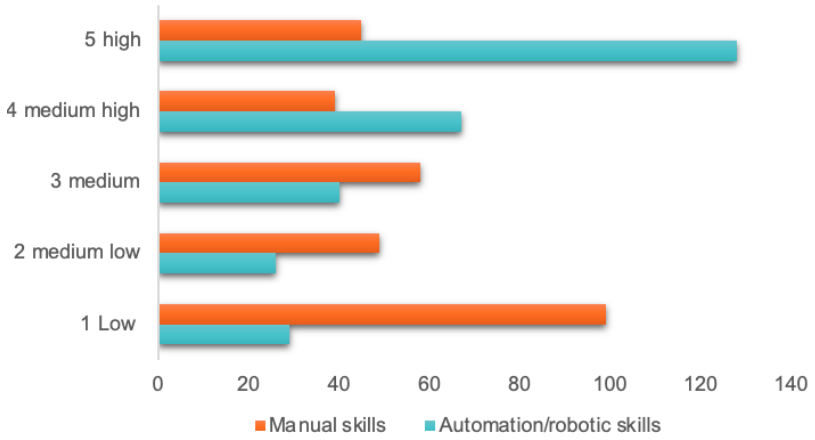
Graph 11: Absolute values of respondents with a high need for different types of skills.

However, the results of the focus groups tend to reposition focus on some of these priorities. **Social and working life skills** remain among the most discussed ones, followed by **entrepreneurial skills** (Graph 12). The less prominent place occupied by manual skills could be explained by the fact that these represent an implicit part of arts & craft businesses.



Graph 12: Number of focus group comments by skill type.

The analysis of questionnaire responses indicates the fact that crafts continue to be based to a large extent on **manual processes** and that the larger the business is, the more it needs these types of abilities. For example, 70% of respondents who declare a high need for manual skills are medium to large enterprises (> 50 employees). Canada seems to have the highest priority for manual/craft skills at present and Armenia the least. Finland does also require manual skills, yet a portion of respondents also don't see these as a top priority. Graph 13 compares the degree of importance assigned to automation skills & manual skills.

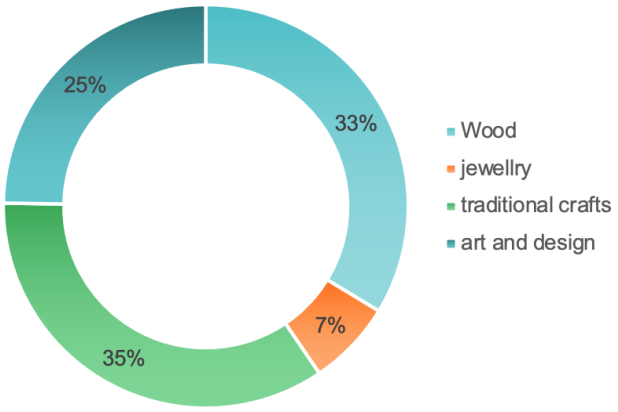


Graph 13: Degree of importance of automation skills compared to manual skills.

Among the core groups of manual skills mentioned in the focus groups we can find **physical abilities** (dexterity, coordination but also practical experience), **technical**

knowledge (technical and material knowledge, knowhow related to machines and generalist knowhow), but also **behaviour aspects** (understanding, analysing, teamwork, security and organising). This proves that manual skills comprise a broad range of abilities that goes beyond a purely technocratic understanding of the term.

Findings also show that **soft skills** like **social abilities** remain important in managing craft businesses, most probably in relation to developing customer and partner relationships. These types of skills are mostly required by the traditional crafts sub-sector, stressing once more the specificity of these occupations which rely on human interaction and collaboration. Graph 14 shows the share of businesses by sub-sector, with a high/very high need for social skills. There seems to also be unanimity for the need of these skills across all responding countries except for Armenia, which scores lower than other countries. This could be explained through cultural differences in terms of norms, attitudes and mindsets shaping social perceptions. Although these skill needs are also high in demand for the wood sub-sector, this is in relative and not absolute terms, because of over-representation of respondents.



Graph 14: Percentages of businesses with a need for social skills by sub-sector.

In the focus groups, **soft skills** are a hot topic. They are a key criterion, often more important than mastery of the technical basics. Indeed, many companies find it difficult to recruit workers:

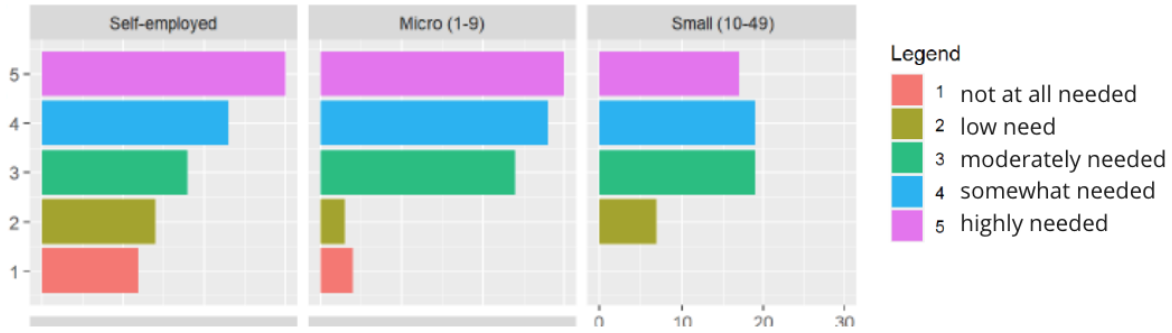
"We also have the problem that we're short of manpower" (ID174), "there's a certain amount of knowledge required for the job in question, but then there's also a certain amount of interpersonal skills within the company" (ID262).

These companies prefer to take on people who have no mastery of the trade but who are willing to develop, especially as this is a factor that greatly favours learning the trade. The most recurrent requirements surrounding these skills come from the formal domains (**lifelong learning, education**), but also informal ones, that are shaped by social factors (**life experience, work value and cultural exchange**). Expectations for fostering these skills are

mainly in the areas of responsibility, work attitude, learning ability, collaboration and cultural capital.

Entrepreneurial skills, although not among the top priorities emerging from the questionnaire, are an important subject of debate in the focus groups. During discussions, the need for a variety of abilities surrounding this area have emerged. Participants discussed a series of soft skills such as versatility, autonomy, self-criticism and self-development, flexibility and precision among the ones prominent in this area. A very strong focus is also set on the area of **change management**, a specific direction in management that refers to the ability to constantly adapt to the shifting business context. These abilities are often connected to *creativity* and *innovativeness*, two concepts which often enable businesses to analyse and anticipate customer needs and then react accordingly. Also in terms of countries, the situation differs. Questionnaire results reveal that entrepreneurial attitude is not highly needed in Canada and Armenia, while it does represent a higher focus for other countries. Finland needs these skills most.

Digital skills appear highly important for all countries except for Armenia and to a lesser extent France. Finland is divided as it has also respondents who don't consider this as a priority. The importance of digital skills is predominant in arts & design and lower in other sub-sectors. Moreover, as shown by Graph 15, the smaller the entity, the less it registers a high need for digital skills.



Graph 15: Evaluation of digital skills by business size.

However, **digital skills** is not an easy topic, as evidenced also by the reflections of different participants to the focus group. When speaking about digital skills, participants mentioned among other the dichotomy between manual and digital skills that still pervades much thinking of the sector, the trend of knowing the latest software to operate machinery, but also the difficulties encountered by companies in the process of digital transformation.

One of the Finnish participants for example explained how such skills lack behind in manufacturing:

"Now if we talk about digital skills in the manufacturing industry, our field in Finland is extremely narrow. That is, just like that, exceptionally narrow." (ID206)

Also the marketing and sales domain, is heavily invested by the need for digital skills, as evidenced by another participant:

"In the creative field, how to say, it is fundamental to be able to create and identify the type of product, not only having a strong connection with one's own personal and artistic creative dimension but also how to sell and promote one's own work. Therefore, also the aspect of digital communication in this case is just as important (ID347).

These reflections show that we cannot simply speak about accumulating digital skills in arts and crafts anymore. We need to shift the digital competencies discourse towards reflections about technological innovation and progress.

Planning and design skills result to be less of a priority according to the results of the questionnaire, though this differs from country to country. Bulgaria seems to have the highest need for planning and design skills and France/Armenia the least. Except for these countries, the importance of planning/design skills remains overall high in other countries. Based on the existing sample size, analysis could not reveal any specific patterns of skill priorities by country, suggesting that the situation varies consistently from one cultural context to the other. As shown above, patterns start to become relevant when analysing the sub-sectoral trends. Based on the focus group results, planning and design skills include a variety of abilities which can be grouped under personal/human (creative personality, personal traits, cultural baggage), technical (manual experience, technical improvement) and creative (artistic skills, creativity, research & development). As some of the focus group participants explain, these are abilities which cannot be totally acquired through studying, but rather through hands-on experience and work inside craft businesses and workshops:

"With artisans I think that there are some things that you can not understand by studying them in books. No one explains them to you, at least this is my past experience. There are situations when you need to get your hands dirty and cannot be enlightened by reading a sentence or how to get where you want to go just through studying. This requires a great deal of knowledge and experience and research too. Objective and subjective research to help you create your own imprint, getting your hands dirty and together with studying will help you achieve this result" (ID368).

Skills fostering sustainable production are the least needed. These results are to some extent surprising, considering that sustainability has been gradually embedded across all dimensions of society and should, including the field of arts & crafts. The lower priority assigned to sustainability skills is the more surprising as we apprehend that 32% of businesses are young entities (founded after 2010) which should better align to contemporary societal needs. Moreover, 65% of companies for which these types of skills are not a priority operate either locally or nationally and the majority are small or medium ones. This could indicate a positive correlation between the size and internationalisation

level of arts and crafts businesses and the need to embed sustainable production skills into business know-how. A closer analysis of the focus group findings in this area reveal the difficulty of dealing with sustainability as a topic. While some participants acknowledge the benefits of acting sustainably and mention the need to develop a sustainable mindset, use recycling practices and obtain green certificates, others stress the reverse side of the medal, such as the greenwashing effect:

"So, you have to educate yourself, do the same to the other person and, I won't lie, no matter how much we want to say recycle, but the truth... let's say the truth, we are lying, because yes, on the one hand. [...]I do recycling, on the other hand, I don't recycle in my house, so we all do that "green wash" that we say. So, the most difficult thing is that no one has learned since the day they were born, they can go and not learn, so we say meaningless words." (ID033)

In terms of companies considering that a combination of skills is required, 61% of respondents highly agree with this statement while only 14% disagree with it. This finding underlines the complexity of arts and crafts activities, which often embed multiple skill sets.

3. Skill gaps by business domain

The third step of the analysis was conducted at the level of business domains (production, production management, administration and marketing), in order to evaluate the skill needs at the micro-level of the enterprise. Factor analysis highlighted the fact that a reduction of variables for these questions is possible both for micro-enterprises and larger businesses (i.e. for both type of enterprises we can group responses according to a similar pattern). This means that no matter the type of business, respondents tend to approach questions 7-10 in a similar way, indicating no major difference of assessment between the different functionalities of the business. Further application of factor analysis on all questions (7-10) reveals the possibility to group the type of skills needed by businesses in 3 groups:

- Network skills (social/human): this is a set of skills that enable the company and individuals to connect with other members of the company or with customers. These include digital skills, social skills and, to a lesser extent, the entrepreneurial spirit of employees.
- Industrial production skills (technical/automatised): these are skills that are used directly to obtain what constitutes the company's characteristic output. These mainly include automation and robotics control skills, as well as knowledge of the principles of sustainable production. To a lesser extent, there is a slight presence of planning and design skills.
- Craft production skills (manual): these are skills held by employees that enable them to contribute to the manufacture of objects. These include manual skills, but also planning and design.

We can thus notice a grouping of the main skills needed by arts and crafts businesses around two operational areas of the enterprise: one that is internal and regards production (skills that include employee-related manual processes, as well as industrial production needed to obtain the final output) and the other which is outward-looking and regards the networking and outreach abilities of the business (skills that include digital, social and entrepreneurial skills).

However, grouping can be performed also by type of skills. Factor analysis applied to question 14 for example, returns the following groups of skills:

- Social and human skills: entrepreneurship, sustainability and social/soft skills
- Manual skills
- Automation skills
- Operational skills: conceptualisation, planification and digitalisation skills

We notice a difference between the groups of skills formed - the general and micro-level classification of skills - consisting in the separation of network skills into two areas: one that is oriented towards relational aspects and the other which is oriented towards operational aspects. We tend to consider the latter grouping option that is more fine-grained and enables us to better define groups of skills. The importance of grouping skills lies in its potential to provide directions for creating innovative training and formation that meets the present and future needs of enterprises. We analyse these aspects in the next chapter.

4. FUTURE SKILL NEEDS

Gathered evidence highlights the need for sustainable and digital skills in the future. This chapter explores these gaps, enablers and barriers perceived by businesses and ways in which they impact skills development. We also make some recommendations for potential directions through which vocational education can meet these needs.

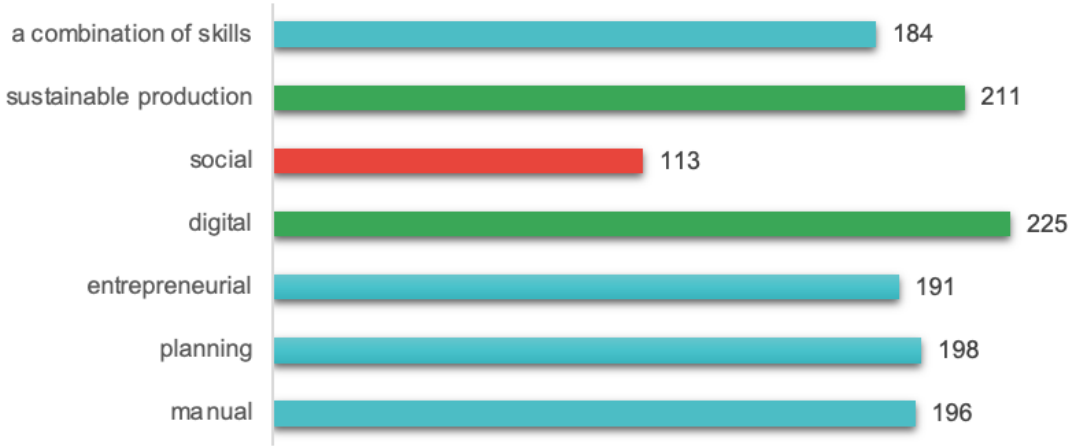
Key insights

- ***Digital skills*** *(reported by 77.5% of questionnaire respondents) and skills fostering sustainable production (reported by 73% of questionnaire respondents) remain among the top areas estimated as necessary for the future*
- *Although only 39% of questionnaire respondents believe they will have a high need for* ***social skills****, this could be attributed to the strong impact of digitalisation, which shifts perceptions to the detriment of soft skills (soft & digital skills often work as opposites)*
- ***Manual and entrepreneurial skills*** *are expected to be also in demand: manual capabilities are perceived as contributors to personal development, brain-hand coordination and to acquiring valuable hands-on expertise; the acquisition of entrepreneurial skills on the other hand is connected to the lack of adequate teaching*
- ***Transversal skills*** *such as flexibility is seen as essential for ensuring the resilience and adaptability to shifts. However, business administration tasks can often limit the exercise of flexibility*
- ***Collaboration/networking skills*** *and hands on work (e.g. apprenticeships) are seen as necessary for the future development of the sector*
- ***Informal processes*** *in skills acquisition remain an important, yet open subject of discussion, highlighted by the focus groups*
- *In conclusion, future generations of workers are expected to be able to* ***creatively combine*** *technical and manual skills, with the latest digital knowledge*

Future directions for skills needs

The problem of assessing future skills needs is not new. For the past decade, we have been training people for jobs that we don't know what they will look like, equipping them with skills we can't really say how they will develop. In this context of high uncertainty and quick shifts, it becomes imperative to develop levers of support in the form of pedagogical measures, which can sustain the resilience of the sector through state-of-the-art education. In order to do that, we need to start by assessing what the industry anticipates in terms of future skill needs.

The results of the questionnaire (question 15) show that digital skills are expected to be the most needed in the future, followed by skills in sustainable production. These results are in line with the current research surrounding craft skills, which explore digital transformation[39] and sustainability[40] as viable paths towards a resilient future of arts and crafts. Surprisingly enough, despite being among the top skills needed by companies in the present, social skills are less appreciated for the future. Graph 16 shows the number of respondents evaluating each type of skill in terms of high future priority.



Graph 16: Number of questionnaire respondents assigning a high rating to different types of future skills.

[39] Satomi, M., & Perner-Wilson, H. (2011). Future master craftsmanship: where we want electronic textile crafts to go. In *ISEA, THe 17th International symposium on electronic art. 14-21 Sep 2011*; Song, M. J. (2022). Craftspeople's new identity: The impact of digital fabrication technologies on craft practices. *International Journal of Technology and Design Education*, *32*(4), 2365-2383; Malakuczi, V., & DI LUCCHIO, L. (2016). Future Factory. New Design skills in the era of post-craft. In *In This Place: Cumulus Association Biannual International Conference: conference proceedings, School of Art & Design, Nottingham Trent University, Nottingham, 27 April-1 May 2016* (pp. 350-357). Nottingham Trent University: CADBE.

[40] Hofverberg, H., Kronlid, D. O., & Östman, L. (2017). Crafting sustainability? An explorative study of craft in three countercultures as a learning path for the future. *Nordic Journal of Science and Technology Studies*, *5*(2), 8-21; Frater, J. (2019). Education for artisans: Beginning a sustainable future for craft traditions. *A cultural economic analysis of craft*, 271-284; Väänänen, N., Pöllänen, S., Kaipainen, M., & Vartiainen, L. (2017). Sustainable craft in practice: From practice to theory. *Craft Research*, *8*(2), 257-284.

However, this result needs to be treated with a certain degree of precaution. First, the results of factor analysis applied to questions 14 and 15 show that variables can be grouped in a similar way. This means there is no real difference in the way in which respondents addressed question 14 (present skills) and question 15 (future skills). A possible interpretation of this result is the following: because it is difficult to estimate future skills needs, these appear very similar to present skills needs. Second, it is not reasonable to conclude that social skills won't be important for the future. On the contrary, they could play an important role as a transversal capacity, impacting technical, entrepreneurial and productive processes. What becomes instead interesting to reflect upon, is how the perception of the importance of this type of skill is steered by the focus on the topic of digitalisation. In fact, digital skills have been rated by questionnaire respondents among the most important ones. This is also supported by the reflection of participants of the focus groups. For example, one participant stresses the huge impact of digitalisation during and after covid:

"We all realised during covid that they (digital skills) were very important and we all jumped on let's say 'digital innovation'. Italy was certainly behind in this aspect." (ID352)

In a context where we run the risk not only of greenwashing, but also of *digital washing,* the need for digitisation and digital skills needs to be addressed with caution. As one focus group participant observed:

"Now there is still the challenge of developing digital skills. Or maybe there will be in the future, but not yet at the moment. Digital skills must be developed when needed." (ID251)

A closer analysis of the enablers and barriers experienced by businesses provide further indications of the potential directions for the evolution of skill needs. The following table provides the main ideas that focus group participants engaged with in relation to these aspects:

Enablers	Impact area/skills	Barriers	Impact area/skills
Working with the hands is a transposition of imagination and improves you constantly as a person	Manual skills (personal development)	Technique is dying off (intergenerational gap/no transmission of skills/business successors)	Manual skills
The better the environment, the more favourable conditions it creates for the development of research, business and social aspects	Sustainability skills	A skilled hand can turn to any craft - making a choice and being consistent is key	Manual skills

The acquisition of competencies takes place through work in companies	Hands-on skills	Skill of the hand replaces the tool	Technical skills
Collaboration and exchanges build competencies	Collaboration skills	Problem of accumulating professional competencies/no need for talent nowadays to accomplish something	Formal vs. informal skills
Skills: >80% are implicitly acquired through life /practical experience	Informally-acquired skills	Specialisation and flexibility are not compatible - The need to be flexible negatively impacts on managerial organisation	Transversal skills
Skills need to be built starting with childhood	Early education	Greenwashing	Sustainability skills
The importance of hand-brain coordination	Manual skills (integrated)	Business aspects are often taught superficially and in a boring way	Entrepreneurial skills
		Skills needed for acquiring sustainability certification	Sustainability skills
		Digital transformation impacting all businesses	Digital skills
		Software: learning the most used by companies	Digital skills
		Legal/financial burden and internationalisation requirements for young enterprises	Entrepreneurial skills
		skills adapted to changing social, cultural and economic systems	Transversal skills

Table 4: Enablers and barriers experienced by arts and craft participants in the focus groups

Manual skills are often discussed. They are drawn upon as contributors to personal development, brain-hand coordination and to acquiring valuable hands-on expertise. Difficulties surrounding manual skills regard both the gap in intergenerational transmission as well as the coherence needed to progress such a manual craft on the long term. Some difficulties are mentioned also in relation to technical abilities, which relate to manual skills.

Collaboration skills are mainly discussed in terms of benefits they bring to the business.

Conversely, **entrepreneurial skills** are connected to inadequate teaching methods (boring/superficial entrepreneurial education) and bureaucratic challenges.

Sustainability skills are also often discussed in terms of the favourable contexts that they foster for business operations to thrive in. However, greenwashing and green certifications put pressure on the operationalisation of green skills.

Two challenges are mentioned in relation to **digital skills**: the need for businesses to align with digital transformation and the punctual need for learning specific software.

Finally, **transversal skills** such as **flexibility** (i.e. those skills that can be used in a wide variety of situations) are discussed in relation to the challenges caused by shifting contexts and the potential negative impact on business administration.

Interestingly, participants also discuss the need for **early education** in crafts as well as the **informal nature** of a large share of the processes of skill formation.

The focus group analysis shows that the discourse around future skill needs is not only surrounded by uncertainty, but also that the nature and evolution of skills is much more nuanced than formal categories can determine. Therefore, addressing skill needs requires thoughtfully planned education and continuous research on skill gaps for example through innovative and flexible initiatives (e.g. crafts observatories).

Recommendations for education and VET training

Education is the most important instrument in bridging skills gaps. In specific vocational training plays a fundamental role in covering the needs of an evolving market. Based on the findings of the skill gaps analysis and the skills needs forecast, we formulate several provisional directions for the development of innovative training modules that meet the needs of the present and immediate future.

1. *Personal sphere:*

- **Self-development skills**: versatility, flexibility, autonomy, self-criticism, lifelong learning, how to learn, persevere and be proactive. These skills become fundamental in a context in which new occupations start to emerge at the intersection of existing domains. For example future arts and crafts professionals would need to be able to combine traditional crafts with tech-based skills, as part of new occupations.

  Can you do problem solving? Can you solve problems quickly? Can you be flexible? Can you adapt to things? And this is the future, adapting.... the change must be so fast that people must be adaptable. (ID043)

- **Work-value skills:** the attitude expressed a deep interest in the craft work through motivation, willness, curiosity, punctuality. These are fundamental conditions of skill development, they encourage the ability to learn and accumulate experience. It also requires other kinds of competence, such as understanding the company's issues, like economics. If the status of an employee is synonymous with contributing to the life of the company, but also to one's own working conditions, the sense of commitment is a key factor.

  "Everything that revolves around this sector needs passion to be able to transform it into a job. What we have realised, working with various targets over the years is that, paradoxically, in the younger generation this passion is either lacking or difficult to find because they are perhaps still in a period of transition. While, in the older target groups the passion becomes stronger, whether they are targets that intend to undertake a job similar to ours or whether they are people who simply want to be passionate about the craft as a hobby. People who are simply passionate from a hobby point of view are able to acquire skills more easily than those who do not yet have a clear idea of their life path." (ID354)

2. *Entrepreneurial sphere:*

- **Change management skills:** the company is always in evolution, craftsmen are always facing new situations with new materials, tools, machines. They should be able to mobilise new resources, new levers for development or demonstrate innovation, creativity and ingenuity in order to overcome difficulties. They also need to be adaptable in their strategies.

"The model, the social, cultural and economic systems have changed completely and so if you don't have a certain type of skill you are absolutely unable to survive with your business. This is the problem and so the contemporary craftsman is a bit like what happens abroad, how can I say I would advise young people to gain a lot of study experience and study a lot because you can no longer sit in your studio and wait for the tourist or the art dealer to come along, in other words a completely different vision of the world is required" (ID364)

- **Creative entrepreneurship skills**: creative activity is different from standard entrepreneurship. As a result, arts and crafts businesses can take specific organisational forms (e.g. networks, hubs and co-creative communities become alternative ways of organising arts and crafts businesses) that do not follow conventional routes. These creators practise a specific form of entrepreneurship that requires skills which go beyond learning the fundamentals of running a business.

3. Cooperation and collaboration sphere:

- **Relational skills:** in many craft business models, there is a complementary activity about demonstrating techniques to the public, realising workshops with people, working in made-to-measure, as a subcontractor or with subcontractors. It requires specific soft and communication skills, and also negotiation or pedagogy.

I've always worked on my own but you should always imagine having a permanent collaborator. This is something I often think about here and what you have to do to cope with these difficulties as always research, passion, commitment, collaboration is what I've always done. And as I have said before, paying attention to what's happening in the world. You can no longer do a certain job by staying in your own little world so a 360 degree attention to what's happening in the world is fundamental. This is what I think generally (ID380)

Experience is also a strong expectation from companies, both human (*"building a creative personality"* ID062) and job-related (*"to be able to react, using tools, constructing by meeting"* ID259). However, it's hard to expect young apprentices to be able to add experience to their knowledge base over the average of a two-year training period. And, as we have already seen in extract ID354, we also need to take into account the period of life that young people are going through. On the other hand, relying solely on on-the-job experience to enable apprentices to develop skills requires a high level of investment on their part. As most companies are small, there are limits to what can be achieved, such as capacity. We can therefore recommend exploring different ways of accumulating experience outside the corporate world (e.g. informal activities). This proposal may seem all the more challenging given that skills needs are generally linked to immersion in the world of work, entrepreneurship and business aspects (marketing, management, etc.). How can we construct a proposal mainly oriented towards skills experience? What are the different methods for generating multiple experiences in training (not only in a company because apprenticeship requires a lot of investment)?

5. CONCLUSIONS

The skill challenge

There has been significant growth in the European cultural and creative industries in the past years, that has outstripped the growth of other sectors like telecommunications, pharmaceuticals or the automotive industry. The arts and crafts sector, which is an important part of the vibrant European cultural and creative industries, is a key contributor to the creative economy and generator of spillover effects. Sustaining the growth in the current context of political, social and economic uncertainty becomes a challenge. In addition, rapid developments in digital technologies are shaping new ways of interacting with cultural and craft goods as well as new ways of creating these. While a digital literate workforce remains necessary to keep up with these changes, being able to operate the latest software is not sufficient to capitalise on the opportunities offered by technological development. Evidence suggests there is a current need for skills, not only in terms of developing digital capabilities, but for a broad range of capabilities that arts and crafts professionals need to possess to face shifting working conditions.

Within this context, craft teaching and learning are evolving today at an unprecedented pace, driving the need for skills that increasingly fuse tradition with innovation. Among the drivers behind these developments are for example the maker movement, the use of digital technologies, project-based and collaborative learning. These shape innovative models of education that emphasise hands-on learning, creativity, and problem-solving through making and tinkering with physical materials and the emergence of new opportunities for creativity and innovation. However, while the industry must quickly gear towards new skills, education systems are not always fully prepared to teach these. The result is the emergence of skill gaps, perceived as the difference between what the industry currently demands in terms of abilities and what existing workforce is able to provide.

The MOSAIC project has set out a 4 year strategy, underpinned by five goals targeting the skill development aspects in arts and crafts. These objectives are operationalised through different activities, including conducting research that maps the evolution of the arts and crafts sector, building innovative vocational education training that can meet present needs and continuing the mapping of crafts skill needs through a crafts observatory. In doing so, the consortium brings together a variety of stakeholders with a stake in arts and crafts education and skills. However, challenges remain. To further develop this work and to achieve proposed goals, it is important to understand current skill gaps as well as future skill needs of the sector. Evidence on skill gaps at the broader EU level is limited because national datasets often do not include analysis on freelancers and micro-businesses and there is a lack of harmonisation of statistical frameworks and measurements. The research presented

in this report goes some way to bridging these gaps in the evidence. It does so, by setting up a methodological framework that is informed by the real needs of arts and crafts stakeholders. It also looks closely at the situation of micro and small businesses which are often not considered in major studies. In doing so, the study provides insights that inform educational strategies to overcome challenges and ensure the thriving of the sector.

Developing education through skill gap analysis: priorities for the future

The skill assessment demonstrates that arts and crafts businesses have a real interest in **social inclusion, digitalisation and sustainability** topics. However, these topics are not easy to deal with, as they pose several difficulties for entrepreneurs. In fact, when speaking about skills in these areas we are often confronted with **paradoxes** and **conflicting junctions**.

Many skills expectations are oriented toward **social inclusion**. Companies are particularly aware that these skills are at the heart of their operating and development strategies. We can set high expectations for versatile qualities in recruitment. These expectations in recruitment are identified as important for running businesses. Yet, we have observed paradoxes in this respect: the versatility expected for this work can clash with the conditions required for singular professions, which are therefore characterised by specialisation.

Different **challenges** hamper the development of skills in these specific areas and interfere with trade, which represents a company's long-term survival. This concern of entrepreneurs is strongly present in discussions, and needs to be understood by those who contribute to the running of the business, especially young apprentices. Competence in the world of commerce and entrepreneurship can make a valuable contribution to business, but is solely not responsible for long-term success. In fact, aspects of **change management** and **creative entrepreneurship** need to complement existing entrepreneurial training and education, to best prepare today's apprentices to become tomorrow's resilient entrepreneurs. However, such training needs to take place in an integrated manner, that is not disconnected from other aspects of the business such as sustainability, inclusion and digitalisation. At the moment, this seems to be the case as evidenced by findings in the study which reveal that the topics of **research and development** and **business models** appear to be rarely associated with young people's skill needs. These are more closely associated with the challenges faced by the company in relation to its environment (sustainability, social inclusion) than with internal factors. Moreover, thinking about business models should be an integral part of companies' strategic visions. However, in the focus group, many companies expressed difficulties in sharing their experiences and strategic visions. We can conclude that, despite the lack of discussion of business models in this study, despite its presence in the questions

and instructions, craft companies have tacit needs in this area. Further research is recommended to be conducted in this area. Another way of addressing this challenge at educational level is by creating **experiential and hands-on training** which enables students to acquire these skills in an **informal manner**.

Digital literacy remains among the top needs of businesses. However, the challenges surrounding this area are many. Digital skills facilitate production, management and other functions of businesses. On the other hand, digitalisation is not neutral; using technology increases the carbon footprint and therefore impacts on **environmental sustainability**. How to align with the digital transformation currently impacting all sectors while keeping the sustainability of their business, represents a daunting task for arts and crafts entrepreneurs. The solution cannot be that of ceaselessly mastering the latest software and hardware tools. Fundamental in this sense is the development of **digital intelligence**, which enables entrepreneurs to learn the fundamentals of digital solutions and experiment how these can impact on and align with their own work. A reasonable use of technology also avoids a high environmental footprint. We should also not ignore the creative capacity of arts and crafts professionals and their potential to reinvent and experiment with different application possibilities of technology. In this context, manual and digital skills cannot be regarded as mutually exclusive anymore, but rather as a fusion, fostered by continuous research and development. An example of how these skills should be integrated in the business is provided by one of the focus group participants:

"As we are in the field of restoration for cultural heritage, our greatest competence in recent years has been to learn how to merge traditional techniques with technological innovation, chemistry and biochemistry. Restoration has developed and there has been a willingness on the part of the research laboratory in the organisation to adapt without neglecting the traditional techniques, being very important for our profession, but to merge them with technological innovation. We could talk a lot about this topic but not now. This is really the focus perhaps and we have been able to do it through the young people who have come over the years. We have invested in the research laboratory. We have also invested in machinery to help us in the curative treatment of all wood pathogens, so we have invested in 4.0 machinery, and so this is currently a skill that is very well suited to us." (ID359)

This statement is in line with further focus group findings which speak about the expectations that companies have from apprentices. The latter must be able to accommodate both **technological and traditional developments**. In other words, the expectations placed on skills do not relate to the tradition and technology of today's trades, but to the changing traditions and technologies of tomorrow's companies. Young apprentices need to learn how to adapt to, and even take part in, potential changes in these two areas. To meet these needs, it is essential to further build on **self-development skills** (e.g. versatility, flexibility, autonomy, self-criticism, lifelong learning, perseverance and proactive mindset) and **work-value skills** (motivation, willness, curiosity, punctuality).

In exercising their activity, arts and crafts entrepreneurs cannot work in isolation but in constant exchange and interaction with their environment. By establishing close relations with partners, clients and subcontractors, entrepreneurs need to build specific **collaboration and networking** skills, which rely on relational abilities. This form of multilateral interaction taking place more and more in the arts and crafts field has two implications. First, it fosters the development of transdisciplinary initiatives, which call for specific types of skills (investigative mindset, methodical thinking etc). It also develops an operational approach of businesses that is systemic, because it thinks in terms of **ecosystem** i.e. the entrepreneur is not considered in isolation from its environment with which it interacts. The ecosystem approach has profound implications on sustainability. Environmental matters are closely related to thinking that everything we do interferes with our close environment. Building collaboration skills through an ecosystem perspective has thus important spillover effects and further contributes to the development of **environmental skills**. This way of approaching sustainability also avoids certifications and other formalisations of green practices which paradoxically requires more resources to invest in, in order to be obtained.

In conclusion, the identified set of skills and groups of skills should be considered when tackling today's sectoral requirements. However, the limitations of this study are still present in the form of the high levels of uncertainty regarding future developments. As one of the focus group participant explains:

"This means that professions will change very significantly in that period of time. How are we going to manage the fact that we all need to have a job also in future? We can only guess, if our work becomes a hobby and if we will live on something else? This is how it is. That's somehow maybe my big question. " (ID233)

While it is not possible to answer such a big question through current research, this study has provided empirical evidence of the importance of building integrated sets of skills that combine personal and technical abilities in order to further build on the adaptation capacity and resilience of future arts and crafts entrepreneurs.

APPENDICES

Appendix 1. Survey for Companies

General Information about the Company

1. Sector of your company *

Select all that apply

☐ Furniture and wood processing (e.g., cabinet making, furniture production, wood working, artistic and industrial upholstery, etc.)

☐ Precious metals and jewelry (e.g., jewelry making, gemstones, precious metals working, etc.)

☐ Traditional and rare crafts and others (e.g., shoemaking, footwear components, artistic ceramics, ceramics, sculpture, blacksmithing, metal processing, restoration, musical instrument making, watchmaking, pottery)

☐ Design & arts industry (e.g., graphic and industrial design, packaging, digital design)

2. Year of foundation:

3. Size of your company? *

Select only one answer

☐ Self-employed

☐ 1—9 employees — Micro

☐ 10—49 employees — Small

☐ 50—249 employees — Medium

☐ 250 employees — Large

4. Location (country)? *

Select only one answer

☐ Armenia

☐ Bulgaria

☐ Canada

☐ Finland

☐ France

☐ Italy

☐ In more than one of the above

☐ Other:

5. Market of your company? * More than one answer is possible Check all that apply

☐ Local

☐ National

☐ International

6. Your position in your company? *

Select only one answer

☐ Owner

☐ Executive Manager

☐ HR Director/Manager

☐ Other:

WORKING LIFE NEEDS IN PRODUCTION TASKS

7. Evaluate to what extent does today's vocational education and know-how of the recently graduated employees respond to the working life needs in the following production tasks?

Self-employed can refer to the vocational education they received (1 = not at all, 3 = moderately, 5 = accurately)

Select one per row

	1	2	3	4	5
Manual and craft skills	☐	☐	☐	☐	☐
Planning and designing	☐	☐	☐	☐	☐
Entrepreneurial attitude/mindset	☐	☐	☐	☐	☐
Digital skills	☐	☐	☐	☐	☐
Automation and robotic skills	☐	☐	☐	☐	☐
Social and working life skills	☐	☐	☐	☐	☐
Understanding the principles of sustainable production	☐	☐	☐	☐	☐

WORKING LIFE NEEDS IN MANAGERIAL LEVEL IN PRODUCTION

8. Evaluate to what extent does today's vocational education and know-how of the recently graduated employees respond to the working life needs in managerial level in production tasks?

Self-employed can refer to the vocational education they received. (1 = not at all, 3 = moderately, 5 = accurately)

Select one per row

	1	2	3	4	5
Manual and craft skills	☐	☐	☐	☐	☐
Planning and designing	☐	☐	☐	☐	☐
Entrepreneurial attitude/mindset	☐	☐	☐	☐	☐

Digital skills	☐	☐	☐	☐	☐
Automation and robotic skills	☐	☐	☐	☐	☐
Social and working life skills	☐	☐	☐	☐	☐
Understanding the principles of sustainable production	☐	☐	☐	☐	☐

WORKING LIFE NEEDS AMONG ADMINISTRATIVE PERSONNEL

9. Evaluate to what extent does today's vocational education and know-how of the recently graduated employees respond to the working life needs among administrative

personnel? *Self-employed can refer to the vocational education they received* (1 = not at all, 3 = moderately, 5 = accurately)

Select one per row

	1	**2**	**3**	**4**	**5**
Manual and craft skills	☐	☐	☐	☐	☐
Planning and designing	☐	☐	☐	☐	☐
Entrepreneurial attitude/mindset	☐	☐	☐	☐	☐
Digital skills	☐	☐	☐	☐	☐

Automation and robotic skills	☐	☐	☐	☐	☐
Social and working life skills	☐	☐	☐	☐	☐
Understanding the principles of sustainable production	☐	☐	☐	☐	☐

	1	2	3	4	5
Business administration skills (e.g. business and financial management, leadership, pricing, marketing)	☐	☐	☐	☐	☐

WORKING LIFE NEEDS AMONG MARKETING AND SALES PERSONNEL

10. Evaluate to what extent does today's vocational education and know-how of the recently graduated employees respond to the working life needs among marketing and sales personnel? *Self-employed can refer to the vocational education they received* (1 = not at all, 3 = moderately, 5 = accurately)

Select one per row

	1	2	3	4	5
Manual and craft skills	☐	☐	☐	☐	☐
Planning and designing	☐	☐	☐	☐	☐
Entrepreneurial attitude/mindset	☐	☐	☐	☐	☐
Digital skills	☐	☐	☐	☐	☐
Automation and robotic skills	☐	☐	☐	☐	☐
Social and working life skills	☐	☐	☐	☐	☐
Understanding the principles of sustainable production	☐	☐	☐	☐	☐

SUSTAINABILITY

11. Evaluate the importance of the following skills regarding **sustainability** (environmental, social and economic) in your company. (1 = not at all, 3 = moderately, 5 = accurately)

Select one per row

	1	2	3	4	5
Design and planning (e.g. circular design knowledge, design for reuse/upscaling, selection of materials, knowledge of relevant ISO standards)	☐	☐	☐	☐	☐
Production and manufacturing (e.g. circular economy knowledge, material use, waste management)	☐	☐	☐	☐	☐
Administration and management (e.g. company's social business policy, well-being at work)	☐	☐	☐	☐	☐
Marketing and sales (e.g. communication of sustainability policies in marketing and sales practices)	☐	☐	☐	☐	☐

ENTREPRENEURSHIP

12. Evaluate the importance of the following skills regarding **entrepreneurship** in your company. (1 = not at all, 3 = moderately, 5 = accurately)

Soft skills (e.g. teamwork, creativity, stress tolerance, resilience, inclusion)	☐	☐	☐	☐	☐

	1	2	3	4	5
Manual and craft skills	☐	☐	☐	☐	☐
Planning and designing	☐	☐	☐	☐	☐
Entrepreneurial attitude/mindset	☐	☐	☐	☐	☐

DIGITALIZATION

13. Evaluate the importance of the following skills regarding **digitalization** in your company. (1 = not at all, 3 = moderately, 5 = accurately)

Select one per row

	1	2	3	4	5
Administration (e.g. software (office, communication, financial and monitoring), information management, digital security)	☐	☐	☐	☐	☐
Planning and design (e.g. technical problem solving skills, software, image design and creation, 3D modeling, survey, project management)	☐	☐	☐	☐	☐
Production and manufacturing (e.g. production, project and process management, immaterial design workflows)	☐	☐	☐	☐	☐
Marketing and sales (e.g. social media management, selection and use of various media channels, online shop management, content creation)	☐	☐	☐	☐	☐

KNOW-HOW NEEDED AT THE MOMENT

14. What kind of know-how would you need the most among your employees **at the moment**? (1 = not at all, 3 = moderately, 5 = very much)

Select one per row

	1	2	3	4	5
Manual and craft skills	☐	☐	☐	☐	☐
Planning and designing	☐	☐	☐	☐	☐
Entrepreneurial attitude/mindset	☐	☐	☐	☐	☐
Digital skills	☐	☐	☐	☐	☐
Automation and robotic skills	☐	☐	☐	☐	☐
Social and working life skills	☐	☐	☐	☐	☐
Understanding the principles of sustainable production	☐	☐	☐	☐	☐
A combination of above-mentioned skills and/or other skills (e.g necessary for workers specializing in more than one role)	☐	☐	☐	☐	☐

KNOW-HOW NEEDED IN THE FUTURE

15. What kind of know-how and skills would benefit your company the most **in the future**? (1 = not at all, 3 = moderately, 5 = very much)

Digital skills	☐	☐	☐	☐	☐
Automation and robotic skills	☐	☐	☐	☐	☐
Social and working life skills	☐	☐	☐	☐	☐

Understanding the principles of sustainable production	☐	☐	☐	☐	☐
A combination of above-mentioned skills and/or other skills (e.g necessary for workers specialising in more than one role)	☐	☐	☐	☐	☐

16. What skills or knowledge should your company's staff possess to be more inclusive?

Check all that apply

☐ Awareness about the importance of inclusive topics

☐ Knowledge about legal regulations on inclusive topics

☐ Knowledge about human rights

☐ Intercultural skills

☐ Willingness / can-do attitude

☐ Open-mindedness / tolerance

☐ Communication skills

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Your name:

Your company:

Your email:

Many thanks for your replies! The MOSAIC Team

Appendix 2. Focus group structure

The focus group was divided into two parts, each composed of 3 questions:

1. What does the word « competences » mean to you and your company ?

2. In a world which is constantly changing, in what way are you making those competences evolve. Could you describe one in particular ?

3. What is the share of informal education skills and competences coming from implicit knowledge that you need inside your business ?

4. We are proposing 5 themes which induce specific needs of competences; which ones seem most important for the future ?

➔ *sustainability, social inclusion, digitalisation, research and development, new business models*

5. Imagine your company in 5 years; are you capable of anticipating the difficulties to come and the competences to implement to face those difficulties.

6. By looking at those themes, is there a domain where the competences seem to you more difficult to put together ? And what are those difficulties ?

Appendix 3. Coding method for focus groups

A series of codes, both theoretical and in vivo were identified in the focus group transcripts:

Code category	Code name
Topics	● Sustainability ● Social inclusion ● Digitalisation ● Research and development ● New business models
Knowledge	● Skills ● Experience ● Techniques ● Versatility ● Learning ● Certification
Business	● Commerce ● Communication ● Investment ● Customer
Society	● Tourism ● Symposium ● Culture
Management	● Difficulties ● Objectives ● Strategies ● Risks
Legislation	● Laws ● Standards / Regulations

Trainees	● Young people ● Apprentice ● Internship
Ways of seeing work	● Passion ● Work values ● Interests ● Experimentation ● Creation
Evolution	● Traditional ● Machines / Technologies ● Collaborations ● Networking ● New market

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