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THE EU AGENCY SUPPORTING COUNTRIES TO DEVELOP THROUGH LEARNING

SKILLS FOR SMART SPECIALISATION

A Handbook based on Experience

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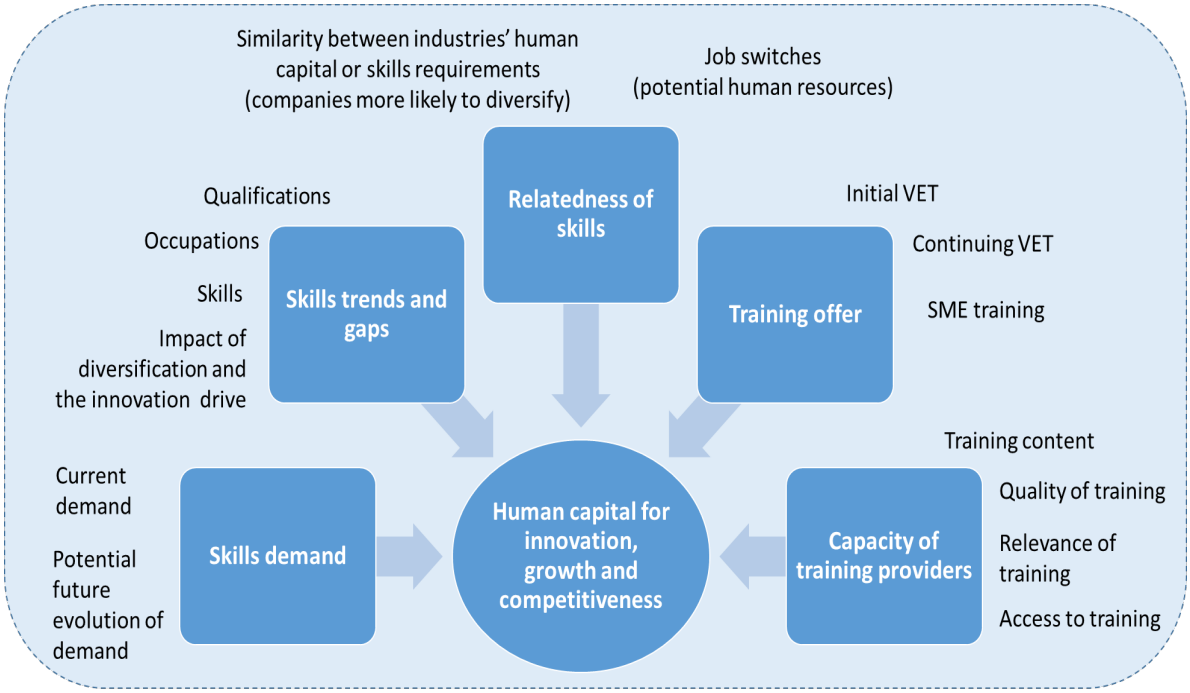
1. Introduction

While smart specialisation is primarily about the economics of specialisation, vocational education and training (VET) and skills are the engine that drive smart specialisation. The ETF's methodological approach on skills for smart specialisation anchors the implementation of smart specialisation strategies in a realistic supply of relevant skills - in particular at medium and high levels. It opens up discussions about skilling, upskilling, reskilling and career development support in the context of the twin digital and green transitions. It offers a concrete tool to connect vocational education and training through productivity-enhancing skills to the drive for innovation, growth and competitiveness. Finally, the ETF's Skills for smart specialisation approach facilitates cross-border partnerships which lay the groundwork for private and public partners to increase use of innovation support from various sources such as Horizon Europe[1], the EU's key funding programme for research and innovation, as well as new funding instruments such as the Interregional Innovation Investments[2]. As a result, the ETF's skills for smart specialisation approach builds pathways for focused VET excellence to flexibly supply relevant human capital and workforce retraining for the private sector for higher productivity and quality jobs.

The reason why the ETF set out to develop a methodological approach in 2019 is that regions and countries that have the right skills are able to do certain things better. They are able to produce more, to produce more complex products and services, and to innovate and make new products or develop services that are not yet available. Moreover, as industries are related through their skills, industries that enter a region are often related to the region's current industries. The reverse also holds true. Industries that exit a region tend to be unrelated to other industries in the region. These elements make human capital development a key determining factor for smart specialisation.

Figure 1. Key elements in the Skills for smart specialisation methodological approach



Source: Authors

[1]List of Participating Countries in Horizon Europe list-3rd-country-participation_horizon-euratom_en.pdf (europa.eu)
[2] mga_i3_en.pdf (europa.eu) call.pdf (europa.eu)

To develop a valid and usable toolkit, the methodology, tools and approaches have been tested to ensure their appropriateness to the requirements of implementing smart specialisation strategies. The testing was first implemented in 2019 in Montenegro in the tourism and energy sectors, which were identified as priorities in the national smart specialisation strategy. In 2020, the testing was expanded to the Republic of Moldova, where the preliminary mapping had identified energy (focus on renewable energy) and food processing as potential priorities for smart specialisation. Finally, in 2021–2022, the methodology was enriched and applied at regional level in Ukraine, in two pilot regions: Rivne and Kharkiv. The lessons learnt are summarised in this toolkit, which contains more than a set of research methods – it also embraces the theoretical and contextual perspectives underlying the analysis, along with a justification for using the chosen approach and tools, and comments from partners.

1.1 Policy background

The European Commission (EC) has a crucial role to play in supporting all regions in the Member States to activate their potential for innovation, competitiveness, sustainable jobs and growth (EC, 2017a). This requires continuous improvements in productivity at both the national and regional levels, and constant adaptation to a changing economic environment. The Cohesion Policy is the EC's strategy to promote and support harmonious development across EU Member States and their regions. It is also the EU's main investment policy for enabling each region to identify and develop its competitive strengths and economic potential through smart specialisation strategies.

Smart specialisation is a place-based approach and is therefore applied primarily at the regional level. Smart specialisation strategies help regions to anticipate, plan and implement their process of economic modernisation (EC, 2017a). They aim to prioritise public investments through a bottom-up approach to regions' economic transformation and facilitate market opportunities in cross-regional value chains. Through its partnership and bottom-up approach, smart specialisation brings together local authorities, academia, businesses and civil society in working towards the implementation of long-term growth strategies supported by EU funds (EC, 2017b).

Since 2011, the EC has called on national and regional authorities to develop smart specialisation strategies for research and innovation which *help regions to anticipate, plan and implement their process of economic modernisation* (EC, 2017a). In 2014, the smart specialisation approach was integrated into the reformed Cohesion Policy for 2014–2020, to maximise the positive impact on growth and jobs. In the European Regional Development Fund (ERDF), specifically under the goal of strengthening research, technological development and innovation, smart specialisation was listed among the investment priorities.

Since 2013, the Joint Research Centre (JRC) of the European Commission has, under the EU Neighbourhood and Enlargement Policy, been providing guidance and assistance to countries beyond EU Member States on the development of smart specialisation strategies. It is in this context that the EC has been supporting methodological reflections around developing smart specialisation strategies in several EU Neighbourhood countries.

Today, the smart specialisation approach is recognised as a strategic approach to increasing evidence-based public investment in order to foster growth and competitiveness at the regional level and improve citizens' well-being. For the Multiannual Financial Framework 2021–2027, the Commission created a component of 'Interregional Innovative Investments' to further strengthen interregional and cross-border cooperation among regions with matching smart specialisation priorities to build pan-European clusters based on complementarities and synergies in key sectors such as big data, circular economy, advanced manufacturing or cybersecurity.

There is a need to consolidate the supply of available skills and vocational education and training (VET) in the tools and methodologies that guide the design and implementation of smart specialisation strategies. In order to fully connect skills to the broader drive for innovation, growth and competitiveness, the ETF has developed and tested a methodology and a practical guide for analysing

the skills implications of smart specialisation strategies. The methodology offers an important means to anchor smart specialisation in a realistic supply of relevant skills at both medium and high level.

As a result of its success, the EC has been sharing the benefits of the smart specialisation approach beyond EU borders, where, despite different framework conditions, it is seen as having potential for promoting decentralised and innovation-led economic transformation as well as fostering interregional and cross-border partnerships. Vocational education and training (VET) and skills development have been recognised as framework conditions for innovation ecosystems. VET and skills are already partially reflected in the tools and methodologies that guide the design of smart specialisation strategies in the ETF partner countries. However, to fully connect VET to the broader drive for innovation, growth and competitiveness, in 2019 the ETF started to develop and test a practical guide for analysing the skills implications of smart specialisation strategies. Building on the lessons learnt from the two pilot studies, in 2020 the ETF strengthened and added to the methodology by adapting it to the regional context. To complete the analysis of skills supply and demand, in 2021 the ETF will add a foresight exercise to the methodology to outline potential development paths for education and training, as a result of smart specialisation. In addition, a partnership-based approach where VET provider(s) are paired up with a centre of vocational excellence in the EU, with matching priority areas for smart specialisation, will be tested to leverage information on future perspectives for peer learning.

1.2 What is smart specialisation

Smart specialisation is an innovative, place-based policy approach and is therefore applied primarily at the regional level. It aims to boost jobs and growth by enabling each region to identify local strengths and assets, and to develop its own competitive advantages. Key characteristics of smart specialisation include, for example: the place-based dimension, which relates to a strong anchorage in territories; its bottom-up character, nurtured by an inclusive dialogue between local authorities, academia, businesses and civil society (the so-called quadruple helix); the identification of investment priorities based on local assets and resources as a result of an Entrepreneurial Discovery Process; and the flexibility of the mechanism to allow improvements, modifications or reassessments throughout the intervention process (JRC, 2019b). Smart specialisation strategies aim to prioritise public investments through a bottom-up approach to regions' economic transformation and facilitate market opportunities in cross-regional value chains.

Since 2011, EU regions and Member States have actively embarked on employing the smart specialisation approach in the context of the European Cohesion Policy. The JRC has been providing advice to regional and national authorities on how to develop and implement their smart specialisation strategies via a mechanism called the 'Smart Specialisation Platform'. This Platform is hosted by the JRC's Growth and Innovation Directorate and facilitates mutual learning, data gathering, analysis and networking opportunities for around 170 EU regions and 18 countries (EC, 2017b). Between 2014 and 2020, more than 120 smart specialisation strategies have been developed and implemented by EU Member States and regions, with an overall budget of almost EUR 67 billion. The platform is not limited to EU Member States. At the time of writing this paper, 19 EU Member States and 10 non-EU countries (Albania, Kosovo, Montenegro, Moldova, North Macedonia, Serbia, Turkey, Ukraine – as well as Australia and Thailand) as well as 187 EU and 18 non-EU regions were registered on the platform.

In 2015, the JRC put in place 'Thematic Platforms', with the support of several of the EC's Directorates-General, to provide an interactive and participatory environment for supporting interregional cooperation in the context of smart specialisation related to the areas of Agri-Food, Energy and Industrial Modernisation. These Platforms are collaborative networks intended to encourage regions and Member States to build interregional and cross-border partnerships and coalitions, and pool resources on the basis of matching smart specialisation priorities. The ultimate goal is to establish European ecosystems for transnational and interregional collaboration in regions and countries with similar or complementary priorities for smart specialisation (JRC, 2020).

In 2018, the JRC published a report entitled 'Supporting an Innovation Agenda for the Western Balkans: tools and methodologies' that offers guidance on the diagnosis of the economic, scientific and innovative potential of countries and regions. In this report, the JRC draws attention to the specificities in transition and developing countries, stating that 'main sources of innovation are not R&D and technology-based but more connected with managerial skills and processes and organisational innovation', further noting that 'investments in physical infrastructure must be accompanied by technological upgrading, skills-development and new management techniques within broader strategic objectives to have a significant effect' (JRC, 2018). In order to guide the process of developing smart specialisation strategies, the report provides a smart specialisation framework for Enlargement and Neighbourhood countries that details the process to follow.

Table 1. Summary of the smart specialisation framework for the EU Enlargement and Neighbourhood countries

Phase	Stage of the process
Institutional capacity	1. Decision to start smart specialisation process
	2. Analysis of strategic mandates
Diagnosis (mapping exercise)	3. Analysis of existing economic, scientific and innovative potential (quantitative)
	4. In-depth analysis of priority domains (qualitative)
Stakeholder dialogue	5. Entrepreneurial discovery process (EDP)
Institutional capacity for implementation	6. Design of monitoring, implementation and financing system
Final strategy	7. Preparation of smart specialisation strategy document

Source: JRC, 2018

In the smart specialisation framework, vocational education and training is included in the quantitative analysis (stage 3), by way of an indicator on the number of students/graduates at vocational schools. However, more extensive analysis of both quantitative and qualitative data would be useful in anchoring the strategy in a realistic supply of relevant skills at both medium and high levels and in defining a medium to long term projection of skill needs for smart specialisation. The flexibility in supplying relevant human capital and workforce retraining for the private sector is directly linked to the ability of companies to drive and adapt to change – and therefore to achieving the strategic priorities set in smart specialisation strategies.

Smart specialisation strategies are likely to be accompanied by a demand for both advanced and medium-level technical skills. This is because higher skills are linked to greater productivity and an enhanced potential for innovation. This points to an important role for both vocational and higher education and training in smart specialisation.

To strengthen the skills dimension in implementing smart specialisation strategies, the ETF has developed and tested a methodology for analysing the skills implications of economic prioritisation. This methodological approach outlines the main aspects of the approach and the methodology tested between 2019 and 2021.

The ETF methodological approach seeks to connect VET to the broader drive for innovation, growth and competitiveness. This approach is carried out through assessing skill needs for the smart specialisation priorities, at both high and medium levels, as well as the capacities of existing education and training provision to respond to them. The preliminary results of testing this approach in Montenegro and Moldova highlight its limitations in the quality and quantity of the existing evidence for

assessing skill needs. Building on these results, the strengthened methodology, including new elements of foresight and peer-to-peer learning will be introduced, in a regional context, in two pilot regions (Rivne and Kharkiv) in Ukraine in 2020.

1.3 The role of VET in smart specialisation

International trade has persistently affected the distribution of population, skills and technologies in the world economy (Galor and Mountford, 2001), and has been a significant force behind diverging per capita income across countries. This situation has given rise to fundamental questions about the growth process as well as the role of human capital and its implications for current and historical development patterns.

In industrial economies the process of industrialisation was associated with the growth of manufacturing, the migration of labour from traditional to modern sectors, and technological advances becoming more frequent and widespread (Veselov and Yarkin, 2015). The expansion of international trade increased levels of specialisation in the production of industrial, skills-intensive goods. The market signals motivated the acquisition of skills, reflecting their complementarity with physical capital and technology. The associated rise in the demand for skilled labour prompted a gradual investment in the quality of the workforce, stimulating technological progress and further enhancing the comparative advantages in producing skills-intensive goods (Galor and Mountford, 2001).

In non-industrial economies, by contrast, international trade generated an incentive to specialise in the production of unskilled, labour-intensive, non-industrial goods (Aghion and Durlauf, 2005). The absence of significant demand for human capital meant there were limited incentives to invest in human capital (Galor and Mountford, 2001). As a result, the demographic transition in non-industrial economies was delayed, further increasing the relative abundance of unskilled labour, magnifying such countries' comparative disadvantage in the production of skilled intensive goods and slowing the course of their development (Aghion and Durlauf, 2005).

The human capital theory typically argues that workers who increase their human capital, through further education and training, contribute to the quantity and quality of goods and services produced as well as enhancing their own value in the labour market (Becker, 1964). Higher skills are also connected with the ability to perform more complex tasks (Green, 2013). Greater functional flexibility and accumulated knowledge mean that highly skilled workers are more capable and faster when it comes to acquiring new areas of expertise and adapting to the structural changes associated with innovation (Toner, 2011). Higher skills thus contribute to greater productivity and increased potential for innovation and creativity (Mason et al., 2017; Hanushek and Woessmann, 2015). This is further connected to positive economic development that builds on the interplay between new knowledge and skills, contributing to technological progress and economic growth. Hence, diversification and innovation promoted through smart specialisation are likely to be accompanied by the need for high level or upper intermediate (technical) skills to support the development of the selected strategic areas.

Within this framework, this article explains the preliminary methodology that has been developed by the ETF and piloted in Montenegro and Moldova. The aim here is to uncover what skills are needed to implement smart specialisation strategies and to what extent the existing evidence in these countries can provide the needed answers. The article also presents selected findings and challenges encountered during the pilot phase. The ETF is further revising and improving this methodological approach throughout 2020 and adapting it to the regional context – while testing it in two pilot regions in Ukraine. The complete methodology, final outcomes and lessons learnt will be published in 2021 in a full report, incorporating the country cases, main conclusions and recommendations.

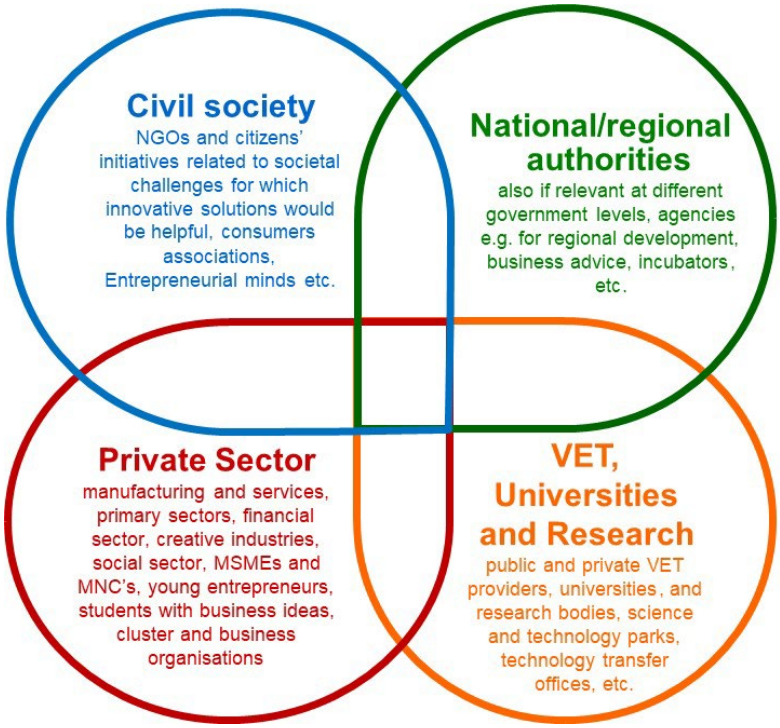
2. Getting started

The ETF's Skills for smart specialisation toolkit is aimed at smart specialisation working groups, the private sector, intermediary bodies, education and training providers, innovation and research actors, relevant civil society actors, etc. Because the approach is designed to support the ability of the ecosystem actors to jointly respond to skilling, upskilling, reskilling and career development support needs that result from smart specialisation, the process and the range of stakeholders relevant for the process are always context specific.

2.1 Who should be involved

The key starting point for the ETF's Skills for smart specialisation approach is the national smart specialisation process, a key characteristic of which is an inclusive dialogue and collaboration between authorities, the private sector, education and training (triple helix model) – and more rarely, in practice, civil society (quadruple helix model).

Figure 2. Quadruple helix



Source: Adapted from the Smart Specialisation Platform (http://s3platform.jrc.ec.europa.eu/)

Governance structures and mechanisms can foster or frustrate the design and implementation of smart specialisation strategies. In fact, many aspects of implementation, in particular the selection of projects for public funding, a continuous entrepreneurial process of discovery and monitoring, are highly influenced by governance arrangements[3]. While no blueprint for a governance structure exists, it is generally acknowledged that a quadruple helix type model, which fosters horizontal and vertical cooperation, is most conducive to a successful smart specialisation process which requires

[3] Good governance - Smart Specialisation Platform (europa.eu)

cooperation and coordination among actors across many institutions and sectors, both at national and sub-national levels (see Box 1).

Box 1: Overview of the governance structure of smart specialisation in Montenegro

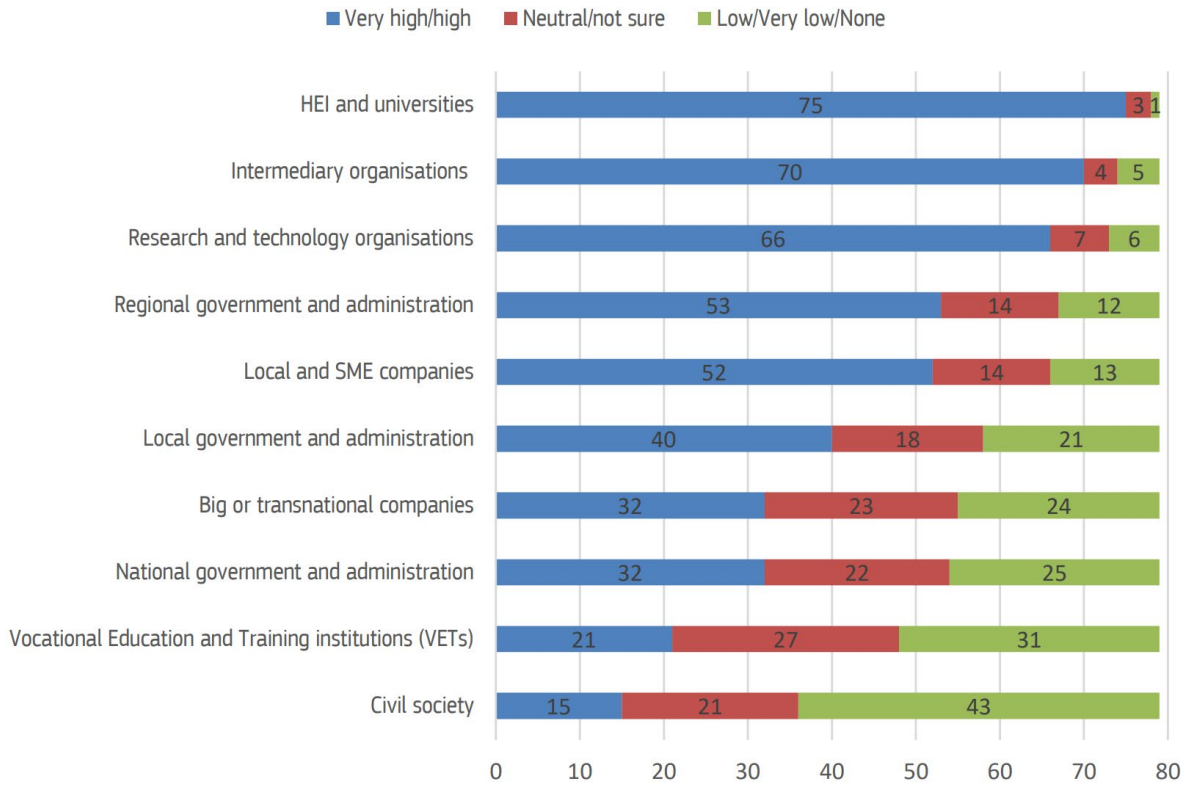
The Smart specialisation strategy of Montenegro 2019–2024 describes the governing structure put in place for designing and implementing the national smart specialisation strategy.
The National Office for Smart Specialisation operates under the Prime Minister's Cabinet and is supported primarily by the Ministry of Science, the Ministry of Economy and the Ministry of Education, as well as by the ministries responsible for projects in priority domains. Its main activities include preparing the national strategy, and monitoring and organising the evaluation of the implementation of the strategy. The role of the Council for Smart Specialisation, as a new public body based on the quadruple helix model, is supervisory in nature. This body supervises, advises and facilitates the transparency of the work of the National Office for Smart Specialisation and encourages collaboration and participation of different segments of society in the implementation of the strategy. The Council is responsible for ensuring the continuity of the Entrepreneurial Discovery Process (EDP). The National Office for Smart Specialisation receives crucial inputs from specialised Entrepreneurial Discovery (EDP) focus groups for identified priority domains for smart specialisation, which have been established to ensure the continuity of the entrepreneurial discovery process.

The entrepreneurial discovery process (EDP) is a key element of smart specialisation governance. The EDP is an ongoing, inclusive, evidence-based process driven by stakeholder engagement to identify the most promising areas for future regional or national development through an '*entrepreneurial process of discovery*'[4]. There is wide heterogeneity in how regions and countries structure their EDP to fit their specific context. The identification of appropriate actors, stakeholder engagement, collaboration and buy-in to the smart specialisation strategy that the EDP generates is key for the subsequent implementation of the ETF's Skills for smart specialisation approach.

The involvement of higher education institutions is systematically high in smart specialisation processes (Figure 3). The role and the relative importance of vocational education and training in smart specialisation varies significantly across regions and countries and within the different stages of smart specialisation from design to implementation. In some regions, higher education and research organisations play a dominant role in the entrepreneurial discovery process from the start. In others, the role of companies is stronger and the process is more balanced. In some regions the role of the authorities is strong. While authorities certainly play a strong role in adopting the approach and governing the smart specialisation process, the ownership of the process has to be shared and driven by broad stakeholder engagement and consensus in order to succeed. The role of intermediate organisations is important in developing synergies and complementarities and reducing fragmentation in the ecosystem.

[4] Foray et al (2009) in 'Smart Specialisation – The Concept'

Figure 3. Level of stakeholders' participation in the RIS3 strategy processes in 19 EU Member States (2021) (the survey gathered 9 responses from national authorities and 70 responses from regional authorities).[5]



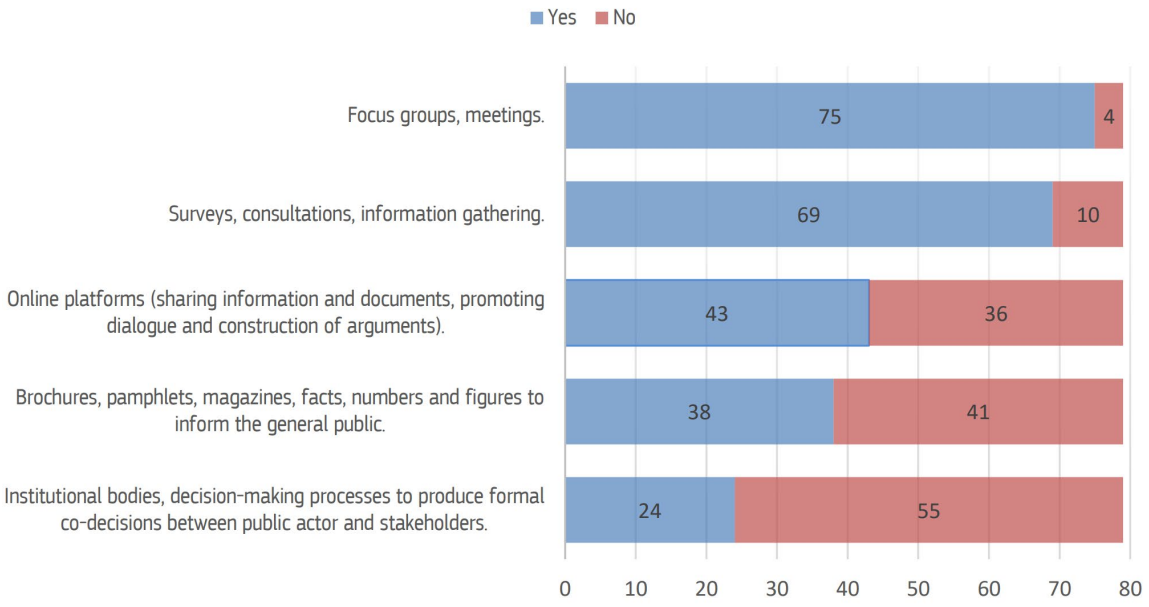
[5] JRC124405_Science.for.policy.publication.pdf

2.2 Instruments to promote stakeholder engagement

Stakeholder engagement is a critical component of the Skills for smart specialisation approach, and successful stakeholder engagement can be challenging for even the most seasoned experts. Stakeholder engagement typically requires careful planning, communication and coordination, and networking. There are multiple ways to engage stakeholders, the most common of which is through focus groups and face-to-face meetings which are important to build a common direction. In the context of the COVID-19 pandemic, different means of online consultation have emerged through surveys and online platforms to allow regular consultation (Figure 4).

Figure 4. Instruments used to promote stakeholder involvement (2021)

(the survey gathered 9 responses from national authorities and 70 responses from regional authorities).[6]

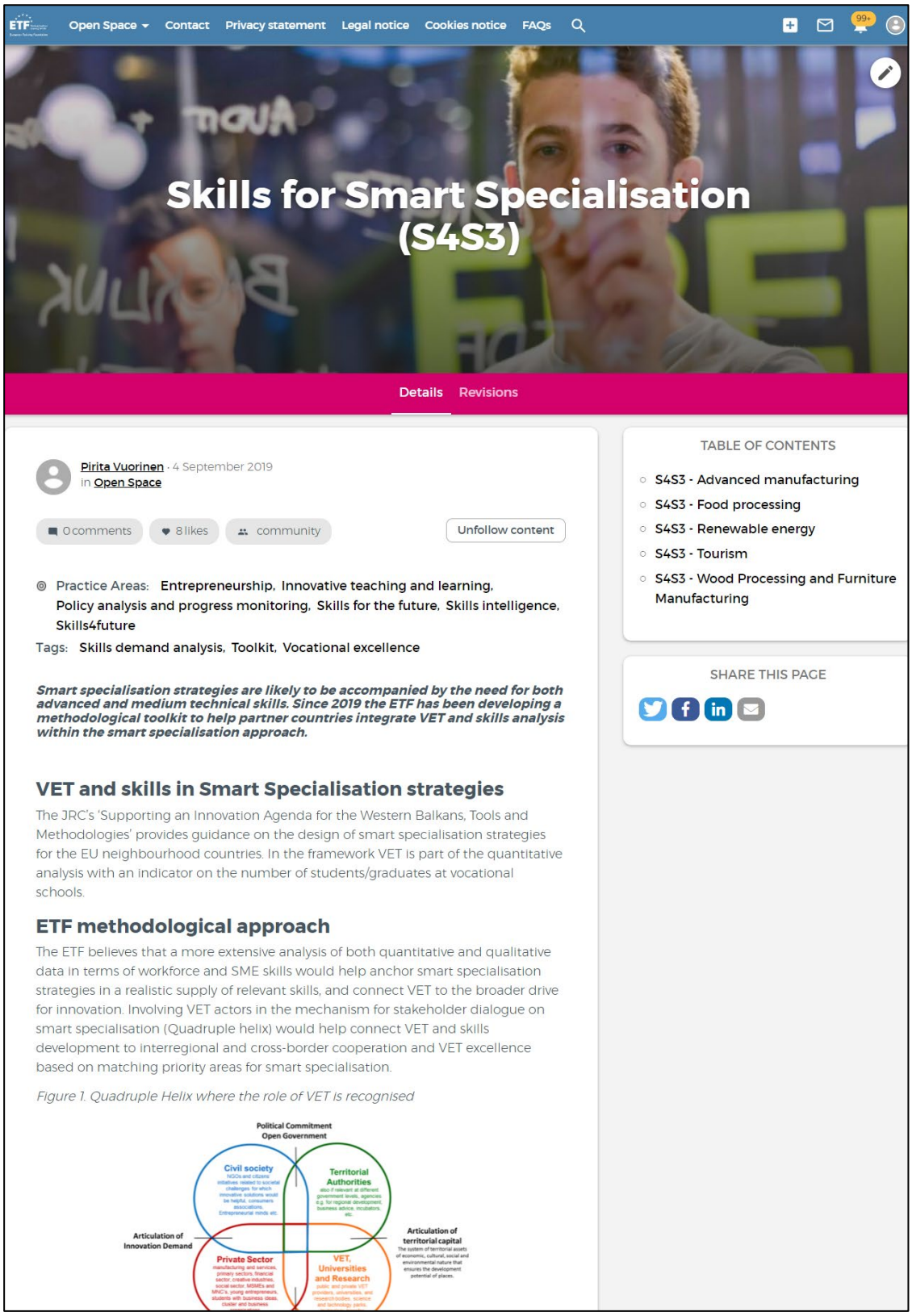


The ETF has been using an online platform, the Open Space, where a dedicated page has been set up as a resource for stakeholders that implement the Skills for smart specialisation approach (see Picture 1). Detailed information on all activities, research and findings – as well as EU partners, both companies and VET institutions – can be found here. The page includes dedicated sub-pages for all sub-sectors where the approach has been tested, which can be used by all stakeholders to store and share information:

- Advanced manufacturing
- Food processing
- Renewable energy
- Tourism
- Wood Processing and Furniture Manufacturing

[6] JRC124405_Science.for.policy.publication.pdf

Picture 1. Skills for smart specialisation page on the ETF Open Space



2.3 Framing the analysis

The toolkit is designed to support the implementation of smart specialisation strategies. Therefore, the key starting point for the ETF's Skills for smart specialisation approach is the national smart specialisation process, with either the regional or national smart specialisation strategy or a mapping of priority areas, along with all the relevant analyses available at the time.

Where the priority area for smart specialisation represents an entire sector or a large segment of it, a narrower analysis may be needed on this specific sub-sector to provide a more focused analysis, more meaningful peer exchanges among ecosystem actors and better targeting of peer-learning activities.

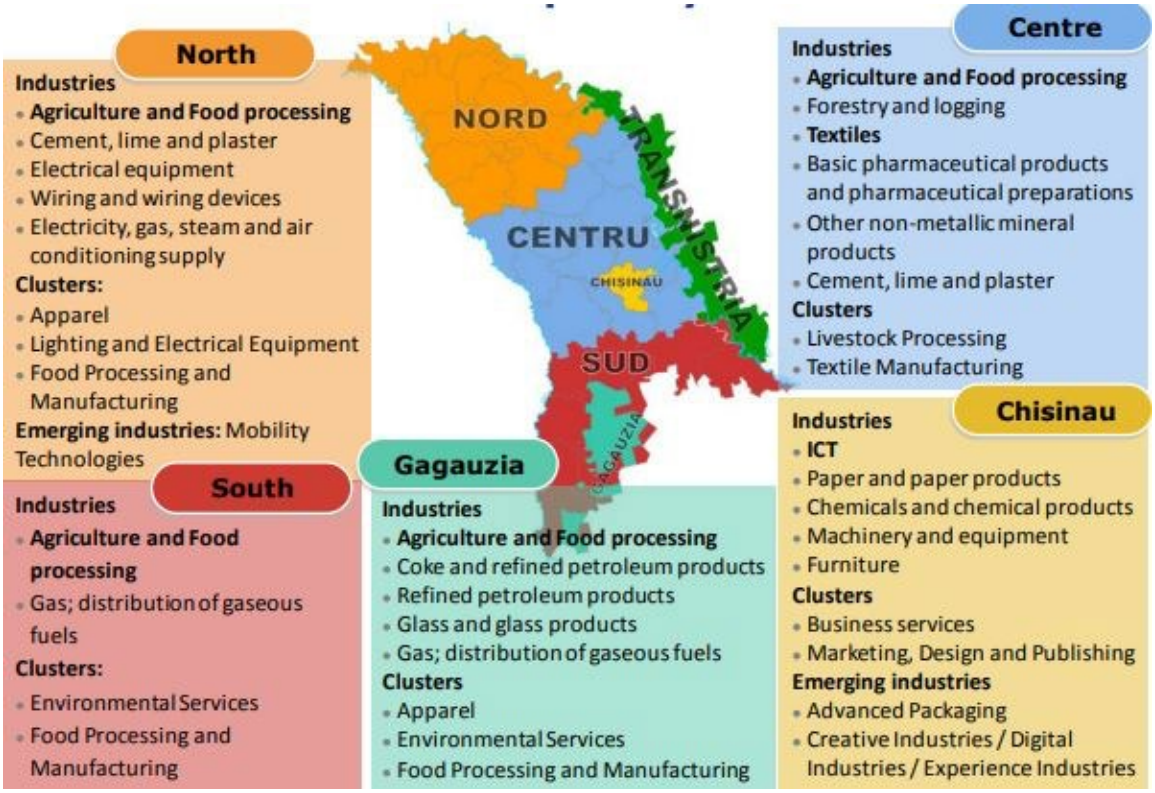
For example, in Moldova, the mapping of economic and innovation potential was implemented in 2018, focusing on five regions: municipality of Chișinău, North, Centre, South and the autonomous territorial unit of Găgăuzia. For the mapping of economic potential, three main dimensions for smart specialisation and innovation policy were taken into consideration: economic, innovative and scientific potential (see Box 2).

When the ETF's Skills for smart specialisation methodology was implemented in Moldova, the process of developing a smart specialisation strategy was still ongoing. For the purposes of the analysis, two preliminary priority areas for smart specialisation were selected by the Ministry of Education, Culture and Research, namely Energy and Agriculture and food processing.

Given the broad scope of each area, the analysis of the Energy preliminary priority area began from a broader analysis of the energy industry. However, due to the size of the industry, a decision was made to focus on Renewable energy, specifically Bioenergy. In the area of Agriculture and food processing, based on an agreement with the Ministry, the analysis was focused on Food processing.

Box 2: Overview of the smart specialisation process in Moldova (ongoing)

The JRC (2018a) analysis on the mapping of economic, innovative and scientific potential in Moldova resulted in the identification of preliminary economic priority areas for the five chosen regions as presented below.



The following preliminary priority areas based on **innovation potential** were identified: Agriculture and food processing, in particular Food chemistry (international patents) and Wine, foods, planting (national patents); and Pharmaceuticals (international patents). For **scientific potential**, the following were identified: Agricultural and biological sciences; Computer science; Energy; and Chemistry and chemical engineering. The preliminary priority areas were further analysed, and the relevant actors were identified (JRC, 2018b).

It is important to note that the preliminary priority area of Energy was relabelled (previously 'Renewable Energy') in order to accommodate the oil industry. For each of the identified areas, entrepreneurial discovery workshops were organised in order to identify the **main smart specialisation niches** that would then contribute to the efficiency of the research process geared to the needs of the national or regional economy.

The development of the smart specialisation strategy is ongoing under the coordination of the Ministry of Education, Culture and Research (MECR).

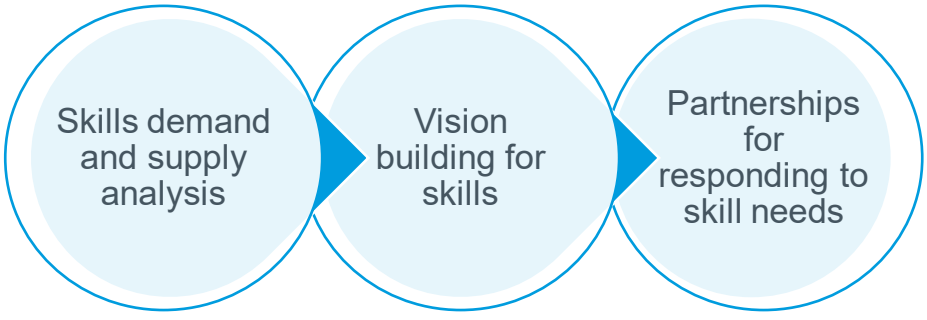
3. Steps to follow

The methodology is a comprehensive package and includes:

- quantitative assessment of the skills dimension (supply and demand) in terms of qualifications (measured through the education level obtained), occupations and skills, taking into consideration demographic characteristics such as gender, age and region;
- to complement the quantitative analysis, conducting of interviews, or other types of qualitative research, with employers, employees and other key stakeholders relevant to the priority area for smart specialisation (further details are provided in Annex 1);
- analysis of the relatedness of Qualifications, Occupations and Skills (QOS) in priority areas, with similar/compatible QOS in shrinking areas with a view to identifying possible alternative uses of skills (if relevant data exist);
- review of the content of existing training offer for Initial Vocational Education and Training (IVET), Continued Vocational Education and Training (CVET), SME training and other types of skills;
- identification of current and emerging skill trends and potential gaps, in terms of occupations, qualifications and skills using both quantitative and qualitative research, including foresight and vision building techniques;
- analysis of the capacity of training providers to match emerging requirements and develop recommendations for improving training content;
- build partnerships and cross-border exchanges to enhance the capacity of companies, training providers and decision-makers for skills development in the priority areas identified for smart specialisation.

The main phases of research are captured in the following figure.

Figure 5: Key components of the Skills for smart specialisation methodology



Source: Authors

3.1 Establish a schedule

The methodology is complex and requires careful planning and good sequencing of the implementation phases. Findings from various phases of the research are mutually reinforcing. Therefore, it is highly recommended to review the feasibility of research methods (in the relevant country or sector), plan each step carefully and set a reasonable timeline for implementation. The most time-consuming and demanding phases are those involving consultations and engagement with various stakeholders.

The time allocated for each phase/stage of research depends on the complexity of the selected priority area, the conditions on the ground, the level of stakeholder engagement in policy dialogue, cooperation between education, employment and economic policy strands, etc. Therefore, we do not prescribe a schedule and duration for each research phase. What is important, however, is that all parties are able to discuss and agree on a clear schedule and are prepared to periodically review the progress and adjust the schedule if necessary.

In a nutshell, the main phases of the research and analysis are as follows:

a. **Inception:** review existing literature pertaining to skills, employment, technological progress relevant for the selected priority area for smart specialisation; review the availability and reliability of statistics; inform the main contributors to the research (e.g. public institutions in charge of data collection, think tanks, social partners, etc.); identify key challenges, risks and corrective measures.

b. **Preparatory:** design and/or adjust methodological guides and instruments for quantitative and qualitative research on skills demand and supply, vision building and partnership components; identify key respondents to questionnaires, participants in focus groups, etc.

c. **Implementation:** roll out the four components as described in the following sections.

d. **Finalisation:** consult all the main stakeholders involved and submit the research products (reports, summaries) for revision, comments and suggestions; review the main products and disseminate the research results.

3.2 Analyse skills demand and supply

The first research phase focuses on the analysis of priority areas identified in the (draft) smart specialisation strategy in terms of employment, occupational and education profile, existing skills shortages and gaps as well as the assessment of the existing training offer and content, including the potential to respond to newer skillsets foreseeable in the context of smart specialisation. As part of the assessment of skills supply, the analysis of the relatedness of QOS is also proposed, provided that the existing data allows for such type of analysis.

The analytical approach combines secondary data analysis, qualitative interviews with relevant stakeholders and desk research of existing studies in the respective countries/regions or internationally.

During the preparatory phase of implementation, data availability and reliability should be assessed. Data sources include both survey and administrative sources, managed by statistical offices, ministries or agencies in charge of education, employment, the economy or other relevant fields.

Box 3: Main data sources for the analysis of skills supply and demand

Labour force statistics

Labour force (or household) surveys are typically conducted by national statistical offices. They provide information on the structure of the labour force and employment status of adult populations, including information on the qualification of respondents, their occupation, sector of employment, participation in training, monthly net average earnings as well as socio-demographic information. Such surveys are conducted regularly, typically on a quarterly basis. Usually, the data can be broken down by region, economic sector and sub-sector, depending on the size and quality of the samples used.

Enterprise statistics

Data from enterprises are typically collected by national statistical offices or public employment services, based on the lists of registered enterprises. Information is gathered from a sample of enterprises or from the entire register, including questions on turnover and exports, but also employment-related information, such as wages or worker mobility. To provide more detailed information on the structure of the labour force or skill needs, skill gaps or vacancies, specific surveys or (ad-hoc) data collection modules are used.

Administrative data on jobseekers and vacancies

Administrative data providing information on registered jobseekers and vacancies is usually collected by public employment services. The typical information covered is socio-demographic characteristics of jobseekers, their qualification, skills, past employment experience as well as type of support provided by the services (i.e. counselling, training, etc.). Public employment services also collect information on existing vacancies, including information on the required occupation, economic sector, place of work, working hours, renumeration or required qualification.

Administrative education statistics

Ministries of education or national statistical offices are responsible for the collection of information from education institutions. Data cover information on the number and characteristics (e.g. socio-demographic characteristics, fields of study) of students, newly enrolled or graduates. Information is also provided on the number of education and training institutions by type, level or programmes provided.

Given the specificities of prioritisation as part of the smart specialisation process, where mostly sub-sectors or clusters of economic activities are considered, the assessment should be carried out at sub-sector level; therefore, the availability of data at the third level of the NACE classification is critical. The selected sub-sectors/priority areas within the smart specialisation strategy do not follow statistical (NACE[7]) classification. The smart specialisation priority areas are presented on a more aggregate level and one priority economic area can consist of several other sectors or sub-sectors (according to NACE classification). For example, in the case of Montenegro, the mapping exercise, which had already been conducted with 46 selected sectors at the third level of the NACE classification, provided a solid basis for sub-sector analysis.

To capture the skills profile and changes in sub-sectors clustered as priority areas requires both quantitative and qualitative investigations, with emphasis on the latter. Although clustered together,

[7] The Statistical Classification of Economic Activities in the European Community (NACE) is the classification of economic activities in the EU. NACE is a 4-digit classification providing the framework for collecting and presenting a large range of statistical data according to economic activity in the fields of economic statistics (e.g. production, employment and national accounts) and in other statistical domains developed within the European statistical system.

sub-sectors reveal very different skills profiles and needs given the specificity of economic activities and associated technologies. Data and information vary greatly as they are shaped by policy and institutional frameworks, existing statistical infrastructure, including relevant previous research, and the broader economic and political context.

Sub-sector approaches to skills anticipation are an important part of the 'toolkit' for economic and skills development. They can secure a fine-grained analysis of the issues related to the potential of economic development of a certain sub-sector or niches of activities. Various sub-sectors have very different skill needs because of the different economic activities they pursue, and the technologies associated with them.

3.2.1 Analyse skills demand

The main quantitative data sources used for the analysis are those stemming from the Labour Force Survey (LFS), surveys and administrative data on companies, wages/revenues, education, unemployment and vacancies. Data should be disaggregated by sector, region, gender and any other variable relevant for the analysis. ISCO, ISCED and NACE levels or groups should be used as far as possible.

Depending on data availability, the analysis should include: (a) socio-demographic variables (gender, age); (b) variables which denote status in the labour market (employed, unemployed, inactive); (c) occupation (by ISCO preferably) and industry (sectors) for the employed; (d) level and field of education; (e) wage level; (f) patterns in employment or unemployment (e.g. typology, length, informality, etc.); (g) participation and outcomes of education and training, including non-formal and informal learning; and (h) industry and size of enterprises, place of work, required qualifications, number of vacancies per position.

The table below reflects the key data sources and types of indicators used for the analysis.

Table 2: Indicators and data sources for skills demand and supply analysis

	DATA SOURCES			
	LFS	Public employment services	Other data sources (administrative or survey sources)	Qualitative skills research
Employment by (sub-)sector, occupation, age, gender, educational attainment, region (and other variables)	x			
Vacancies by occupation, (sub-)sector, education level and profile, region (and other variables)		x		
Labour force (i.e. working age active population) by age, gender, education, region	x			
Unemployment, by age, gender, education level and profile, region, duration	x	x		
NEET (not in employment, education or training), by age, gender, educational attainment, region (NEET status/sub-groups)	x			

Structure of graduates (gender, education level and profile of study, region)			x	
Participation of adults in education and training (by age, gender, region, type and profile of training/learning)	x		x	
Skills mismatch (vertical and horizontal mismatch, over- or under-education/qualification)	X		x	x
Skills gaps, skills obsolescence				x
Coefficient of variation (differences in education levels between employed and unemployed)	x			
Wage rates (relative)	x		x	x
Hard-to-fill skills – shortage vacancies		x		x
Skills gaps reported by employers		x		x

Source: Authors

Qualitative information complements the quantitative data on occupational and skills trends. The main reason of such complementing research is the insufficiency (availability, relevance) of existing statistics for an accurate and complete analysis of skills dynamics in the priority areas. Therefore, qualitative methods need to be employed to fill in gaps and add value or contextualise the findings from the quantitative analysis.

This can be carried out through in-depth interviews and/or consultations (done face-to-face, over the phone or online) with relevant stakeholders, using a clear set of guiding questions and/or questionnaires. Interview guides for the three main target groups have to be adapted to the national context and tested (see Annex 1 for examples of structured interviews and questionnaires).

The main topics covered in the qualitative research are skill needs; skill gaps; vacancies; training activities (or human resource development strategies more generally); strategy to attract and retain specialised workforce; bottlenecks in company development; and local/regional or sector development priorities.

Research teams should focus on three main target groups for gathering such insights:

- companies active in the respective priority areas and business/employer associations;
- employees of the respective companies;
- representatives of central and local public administration, professional bodies, social partners and other actors relevant for the respective priority areas.

3.2.2 Analyse skills supply

The analysis of priority areas in terms of employment characteristics and skills demand is further complemented by the mapping of the existing education and training offer, both initial and continuous, relevant to the selected priority areas in order understand to what extent it can respond to the identified skills gaps and needs.

The review and assessment of the existing training offer should cover IVET, CVET, tertiary education and other types of skills (e.g. transversal, managerial) in the priority areas for smart specialisation.

The following information should be gathered: IVET, CVET and tertiary education providers; students enrolled and graduates of education programmes relevant for the sectors/sub-sectors in question; existing qualifications in these sectors; and available education and training programmes. Sources for such data are administrative and managed by different institutions.

In addition to quantitative information, interviews or focus groups (with education and training providers and employers) can reveal more insights on the shortcomings in terms of quality or relevance of available training programmes, or to what extent occupational or qualification standards still correspond to job and competence requirements of respective professions and sectors (e.g. new technologies, digital skills, other transversal competences).

Finally, information on the availability and quality of education and training on offer should be matched with the outcomes of the skills demand analysis. Such comparison determines existing or emerging gaps, potential needs to review the content of qualifications, curricula or the modes of training provision.

Box 4: Analysis of the relatedness of Qualifications, Occupations and Skills (QOS)

This kind of analysis, which can be implemented as part of the analysis related to skills supply, seeks to provide answers to the following questions: How mobile are workers across industries? Which industries can easily exchange labour? Such questions matter, because on the one hand, changes in an economy's industrial structure require the transfer of productive capacity, and thus of workers, from shrinking to growing industries. On the other hand, labour mobility transfers the know-how of workers across firms, industries and locations.

In the context of labour market and skills transformations triggered by smart specialisation, this research module should shed light on the following topics: How large is the set of industries a worker chooses from when he or she changes jobs? Do different types of workers switch within the same industries, i.e. do they follow the same industrial transition matrix? To what extent do the mobility constraints expressed in this network prevent an economy from reallocating labour from shrinking to growing industries?

The conceptual starting point is that, if jobs require industry-specific human capital, the mobility of workers across industries will be constrained, and inter-industry labour flows will be shaped by those constraints.

Analyses of inter-industry labour flows should answer several questions important to understanding QOS relatedness:

- Do workers often switch jobs between industries that belong to different sections of the industrial classification system?
- Which industries considered as developing industries absorb labour flows from shrinking industries?
- Does the structure of inter-industry transitions change over time?

The final aim of the QOS analysis is to derive several stylised facts using the data on:

- general structure of the labour flows in terms of the amount of job switches;
- the degree to which labour flows concentrate in relatively few industry pairs;
- the general structure underlying these flows by plotting the skills-relatedness network and comparing the skills-relatedness matrices for different labour market segments;

- how skills-relatedness affects local labour markets by estimating local industry-growth regressions;
- the extent to which the limited mobility of workers across industries could potentially hinder an efficient reallocation of workers from shrinking to growing industries.

The analysis of inter-industry labour flows should reveal how industries are connected to one another in terms of their human capital requirements. QOS analyses focus on cross-industry labour-flow patterns; flexibility (ability of an industry to absorb workers who leave another industry); skills-relatedness structure of labour-flow matrices – the size of labour flow will depend on the size and flow rates (the fraction of employees switching jobs) of the industries involved; comparing skills-relatedness across labour market segments; skills-relatedness and the growth of local industries; and skills-relatedness and reallocation frictions.

While all the research questions and topics are relevant for studying skills-relatedness, data limitations in many countries restrict the analysis. This was the case in the countries where the methodology was tested (Montenegro, Moldova, Ukraine) since key labour market indicators by detailed level of occupations and transitions of workers from one occupational area or sub-sector to another are not fully available (due to low accuracy of disaggregated data and limited number of observations).

The box below presents examples of findings stemming from the quantitative and qualitative analysis of skills demand and supply in Montenegro, carried out in 2019 and 2022.

Box 5: Key findings of skills demand and supply analysis carried out in Montenegro

Both priority areas for smart specialisation – renewable energy and health tourism – have great potential to create new jobs with more attractive working conditions in Montenegro. Although the education and training system is not yet fully geared towards the specific needs of the two sub-sectors, several upper secondary and tertiary-level programmes are relevant for qualifications and skills in demand. The quantitative analysis of skills was somewhat constrained by insufficient data availability at sub-sector and regional levels. […]

Given the skills patterns among the workforce (both employed and unemployed), there are positive correlation coefficients for potential inter-sectoral mobility from shrinking to growing (sub-)sectors. The strongest relatedness between the two sub-sectors is found with construction, transportation and services. Activation and retraining programmes should particularly target the workforce released from regions and downsizing sub-sectors and help people move into economic activities with growing potential. Salary is the most important factor in deciding to take a new job, but other working conditions, including the type and duration of the labour contract and the overall workplace environment are important as well. […]

Occupational and qualifications standards and training programmes should be developed for qualifications specific to renewable energy and health tourism. In the short term, prioritisation of continuous vocational programmes (qualification levels 4 and 5) is recommended, as they are less time-consuming and can help alleviate unemployment and transition to in-demand sectors. A significant number of unemployed people from the shrinking sectors/sub-sectors of

mechanical engineering could be reskilled or upskilled to find a job in the renewable energy and other related sectors.

Key competences and transversal skills scored highly among the skill needs revealed through the interviews with both employers and employees. Acquiring such competences should be secured in initial education, but also through lifelong learning courses. English knowledge is a growing requirement in the respective sub-sectors, and is very often a compulsory requirement for hiring. […]

ICT-related developments have and will continue to change the two sub-sectors, with many support and administrative roles disappearing. There will be an increasing need for education and training systems to respond to developments in technology by providing new skills and preparing people for new occupations.

There is also a need for innovative and flexible forms of education and training to meet the skill needs of micro and small, including family-run, businesses, which are in general rather predominant in Montenegro, compared to its Balkans peers and Europe overall. […]

Source: ETF Working Paper on Understanding and Managing Skills as a Key Resource for Growth and Competitiveness in Montenegro (ETF, 2020).

3.3 Build a vision for skills

Building on the analysis of skills demand and supply within a priority area, a foresight[8] exercise is the next methodological step. It helps to systematise and validate the evidence collected, strengthen the interinstitutional dialogue, including education and training providers and employers in particular, and help to build a shared vision and commitment for skills.

The key objective of the foresight exercise is to support the vision building exercise for skills within a selected smart specialisation priority area. More specifically, it aims to:

- validate the results of quantitative and qualitative evidence already collected during the first phase (see section 3.2);
- identify and/or validate the main skill sets to support the economic prioritisation process; and
- develop a shared vision on how to shape and manage the existing education and training provision (incl. formal, non-formal, and informal VET) to respond to new skill needs. In other words, formulate clearly delineated policy proposal packages, with a responsible body for each (reporting to the regional smart specialisation team leading the collaborative work), to shape education and training provision in the context of the region's smart specialisation strategy.

[8] 'Foresight is a future-oriented, participatory, systematic process. In relation to HRD, it draws on knowledge from different policy areas to make sense of the interconnectedness of the economy, the education system, the labour market, the social dimension, and regional and territorial aspects. This enables stakeholders to work together to define a shared medium- to long-term vision for their country or sector, as the basis for designing more coherent and evidence-based policies and measures that all stakeholders can sign up to and implement.' (ETF, 2014:6)

The foresight action helps to identify skills priorities, which in turn help to shape partnerships with peers, who are involved from the beginning of the foresight action, from regions with matching smart specialisation priorities to exchange knowledge and experiences with one another.

The implementation of the foresight exercise includes different steps and can use a range of methods. The methods can be broadly divided into qualitative vs. quantitative, predictive vs. non-predictive or, most importantly, exploratory vs. normative methods. Exploratory methods start with the present and try to explore a future or possible futures. Normative methods, on the other hand, start with a desirable future or futures and aim to define how those could be achieved. The choice of method(s) depends on context, resources, time frame or set goals.[9]

The aim of the proposed approach below is to implement a simple (qualitative) foresight exercise, which would be possible to conclude over a short period of time (approximately for 6 months). Given its objectives (see above) the approach is both exploratory (developing a shared vision for future skills) as well as normative (defining policy packages to support the vision for skills). The focus of this foresight exercise is, thus, on visioning[10] and roadmapping[11], implemented through expert panel and Delphi surveys. It is important to note that the approach followed is one of many, as other methods and tools can be used as well as the order of the tools employed can be adjusted to specific contexts.

The foresight exercise typically covers several phases, which are summarised in Table 3. It is important to set up a team responsible for the foresight implementation, to map and engage stakeholders and to run the actual implementation.

Table 3: Phases during the implementation of the foresight

Phases	Tasks to be done
Pre-foresight	• Scoping phase with basic preparation for the exercise. • Preparing necessary documents (including statistics, expert opinions and results of the analysis from the first stage). • Determining expert panel composition.
Engagement	• Securing technical support and resources. • Involving relevant stakeholders in the exercise to lay the foundations to establish a community of practice for continuous skills foresight at regional level. • Agree and inform the stakeholders about the timing and activities within the foresight process
Foresight proper	• Building teams (bringing together different actors). • Discussing the findings of quantitative and qualitative evidence already collected during the first phase of the project. • Determining and drawing up a preferred vision of the future, to help decision-makers acquire knowledge and understanding to anticipate the context in which they have to act.[12]

[9] More information on foresight and existing methods, see Kriechel, B., Wilson, R.A., Bakule, M., Czesana, V., Havlickova, V., Rasovec, T. (2016). *Guide to skills anticipation and matching – volume 2: Developing skills foresights, scenarios and forecasts.* Luxembourg: Publications Office. Jointly published by Cedefop, ETF and ILO.
[10] A participatory process through which stakeholders develop a shared vision of future.
[11] An interactive and consensus-building process which aims to build a shared understanding among stakeholders on steps that need to be taken to achieve a desired future.
[12] Although the focus here is on defining the future vision for skills, the foresight exercise may need to start with defining or clarifying the vision for the development of smart specialisation priority areas before moving to the main objectives of the foresight exercise.

	• Acquiring an understanding of the required evolution of VET (formal, non-formal, and informal) provision in terms of qualification and occupational profiles – and develop policy proposal packages in order respond to the vision while avoiding skills mismatches and supporting the successful implementation of the region's smart specialisation strategy.
Follow up	• Formal debriefing of results to regional teams working on smart specialisation • Lock-in and commitment after the exercise • Partnerships development, building on the foresight exercise • Communicating results to a wider audience

3.3.1 Implementation team

The decision on the implementation team leading on the foresight exercise is crucial, as the team needs to have capacity and authority to run the action. Typically, it should be the (national/regional) Smart specialisation working group, possibly with support from national expert(s).

3.3.2 Stakeholder engagement

The engagement of relevant stakeholders is the basis for successful implementation of the foresight exercise. The selection of key stakeholders should aim to have representatives of relevant institutions having a role in the smart specialisation process as well as in regional/national skills system. For building the vision for skills for economic prioritisation, the following stakeholders/institutions should be engaged:

- representatives of state regional administrations responsible for economic development;
- representatives of state regional administrations responsible for education;
- employers (micro, small, medium, large and multinational corporations);
- representatives of education providers (both VET and higher education);
- representatives of chambers, employers' organisations, etc.;
- thematic expert(s) both national and international (for perspectives on global megatrends and good practices);
- partner VET providers from EU regions with matching smart specialisation priorities.

3.3.3 Foresight exercise implementation

For the foresight exercise proper, a combination of two methods – expert panels and the Delphi method – is proposed. The main aim of the expert panels is, firstly, to build a vision on key skill needs for economic prioritisation in terms of qualification and occupational profiles. Secondly, it should develop policy proposals on how to shape and organise the education and training provision to respond to such needs. The input collected from expert panels is then integrated into a Delphi survey, the aim of which is to consolidate and prioritise the results of expert discussions.

Expert panels are a key method for the foresight exercise, targeting primarily the representatives of regional government, employers, education and training providers, researchers and representatives of relevant professional associations. The number of participants should be ideally between 12 and 20.

The tasks of panels include vision building for skills (in terms of occupational and qualification profiles), input and review of Delphi surveys and policy proposals related to the shaping and management of education and training provision.

A minimum of three (face-to-face) consultation workshops should be organised. The first meeting should be held at the beginning of the process to introduce the foresight objectives and to ensure commitment from the stakeholders/experts. The second workshop should aim to review the results of the Delphi survey(s) and progress. In addition, it should also explore the actions to be taken to achieve the formulated vision. Finally, the third workshop should aim at formalising the vision and identified policy packages.

Box 6: EXPERT panel

The expert panel is an exploratory foresight method which is used to develop and share ideas or knowledge. It also aims to find consensus and priorities on key issues. One of the most important elements is the identification and involvement of relevant stakeholders, who also represent a good mix in terms of institutional representation or roles in, for example, the skills supply-demand system. In Rivne, Ukraine, the panel included the representatives of regional administration, relevant VET providers, employers and representatives of sectoral associations.

Such panels meet on a regular basis. Meetings can be held face-to-face, but online interactions are also possible. Each meeting must be structured along main objectives and questions.

Source: Kriechel, B., Wilson, R.A., Bakule, M., Czesana, V., Havlickova, V., Rasovec, T. (2016). Guide to skills anticipation and matching – volume 2: Developing skills foresights, scenarios and forecasts. Luxembourg: Publications Office. Jointly published by Cedefop, ETF and ILO.

Delphi surveys should be developed based on the output of expert panels and target respondents from different professional and institutional backgrounds.

They should consist of statements from the expert panels, which are then assessed by respondents against pre-defined criteria. Several rounds can take place in order to achieve a consensus. Each survey round should be analysed and reviewed by expert panels.

Box 7: DELPHI survey

The Delphi survey is an expert survey which is usually carried out at least twice, with each round building on the previous one. The main aim is to gather information and find consensus on specific questions, trends or policy goals. The Delphi survey does not aim to be

representative, but it is submitted to experts who have knowledge on a specific topic. It can be carried out in paper or electronic form.

The questions in such a survey are usually a set of statements (derived, for example, from desk research of expert working groups), on which respondents should provide their opinions. Each round serves for the formulation of questions for the next rounds of data collection. The process should be concluded when a consensus is reached. The survey also allows the respondents to add rankings and comments.

Source: Kriechel, B., Wilson, R.A., Bakule, M., Czesana, V., Havlickova, V., Rasovec, T. (2016). Guide to skills anticipation and matching – volume 2: Developing skills foresights, scenarios and forecasts. Luxembourg: Publications Office. Jointly published by Cedefop, ETF and ILO.

The final output of the foresight exercise is a summary report which should include information on the process, identified skill sets (including occupational and qualification profiles), as well as policy packages related to future training and education provision.

Box 8: Foresight exercise in Rivne, Ukraine

The foresight exercise was implemented in Rivne, Ukraine, in the first half of 2021, focusing on the skills implications for the priority area of Wood-processing and Furniture manufacturing. The foresight exercise was structured in the following way and carried out online due to COVID-19 restrictions.

1. A launch meeting was organised with selected stakeholders that formed an expert panel. The aim of the meeting was to bring together different actors, provide further information on the foresight process, especially its objectives and timeline. In addition, it was used to present findings from a preliminary analysis focusing on skills supply and demand in a priority area and the vision for the development of Wood-processing and Furniture manufacturing. This was followed by a discussion on a vision for skills to accompany the economic prioritisation.
2. A Delphi survey was prepared with the aim of validating and prioritising skills implications identified during the expert panel.
3. An Expert meeting was held do discuss and validate the results of the Delphi survey and to launch a discussion on policy packages/responses to support the identified priorities in terms of skills development.
4. A Delphi survey was built focusing on policy packages/responses and their prioritisation.
5. A final expert meeting was organised to build on the results of the Deplhi survey and to consolidate the discussion. A formal vision for skills as well as priority policy responses were identified.

3.4 Establish partnerships

There is ever-increasing attention on partnerships. It is generally accepted that partnership-based approaches work, but can they work better? As specialisation and mutual interests drive cooperation, the ETF's Skills for smart specialisation approach seeks to engage peer-learning partnerships in a new way to achieve a greater impact. By connecting partners from matching priority areas for smart specialisation and by facilitating peer-learning partnerships over a period of time, the approach aims to gradually build up the skills of stakeholders to engage in partnerships in a new and sustained manner.

The ETF's Skills for smart specialisation approach starts by engaging the ecosystem actors in a discussion around the importance and role of human resources in the local innovation ecosystem. Cross-border partnership dialogue is first engaged in a vision building exercise for skills (see 3.3), following the completion of the quantitative and qualitative analysis (see 3.2) in the selected sub-sector. Developing a common vision and objectives is a cornerstone of the Skills for smart specialisation process. A vision is an important qualitative description of the desired future for the ecosystem. It provides the basis for the subsequent steps of identifying skill needs and determining priority peer-learning measures.

The partners play a pivotal role in the foresight exercise (see 3.3) in identifying priority areas for strengthening skilling, upskilling, and reskilling as well as updating career development support. The identification of skill needs and learning from peers blend in naturally, as part of working together to understand future skill needs of the sub-sector, and allows all parties to think critically and ask questions about what is important and why, and to discuss possible solutions and why they would or would not be good choices, things to consider, and different ways to solve the same problem.

The ETF is responsible for identifying and engaging partnerships. The partnership approach, both ecosystem and cross-border, build on the stakeholder mobilisation and engagement established throughout the EDP and the related stakeholder dialogue mechanisms and tools already in place for smart specialisation. The identification of partners is made on case-by-case basis, but the partners are always active in the same sub-sector and can include a combination of companies, regional authorities, VET institutions, etc.

The ETF helps establish peer-learning partnerships to prepare the ecosystems so as to make the most of the opportunities in today's world, where partnerships and networking are a way of life. Partnerships and networks are instrumental in stimulating knowledge transfer, joint thinking, and in expanding networks for all parties involved. More importantly, they enable the creation of critical mass to attract/qualify for funding/investment for skilling, upskilling, and reskilling, and for experimenting, disseminating and scaling up innovation.

To improve the innovation capacity of SMEs, new areas identified as requiring further focused support in terms of gradual build-up of partnership arrangements include technology transfer, both in the ecosystem and internationally, and developing knowledge and solutions through applied research. Technology transfer through collaborative partnership arrangements provides a means whereby SMEs can take advantage of resources, while sharing costs and potential risks[13]. SMEs can also make best use of their own resources by extending the application of their know-how through its transfer to partners.

In Rivne, Ukraine, two peer-learning partnerships were identified:

[13] (PDF) Technology Transfer Through Collaborative Partnership Arrangements: Issues and Considerations (researchgate.net)

Box 9: HMC, school for wood, furniture and interior professionals Rotterdam, Netherlands

Website: https://hmcollege.nl/

HMC is engaged with the ETF in Rivne, Ukraine, to share their experience on understanding trends and possible future developments in the furniture manufacturing and woodworking sector, and ensuring that the students have the right skills at the right time - in support of regional competitiveness.

HMC is an independent post-secondary vocational college where students are trained for a profession in woodworking, furniture or interior design sectors in the Netherlands. Established in 1929, HMC focuses on creativity, craftsmanship and entrepreneurship. HMC has teaching locations in Amsterdam and Rotterdam. The school is a relatively small college (3000 students). Many teachers previously worked in the field or still do part time.

Over the years, extensive contacts have been built up with the industry, so the education fits well with the working practice and their students have a wide choice of work placements. HMC offers mainstream education (school-based as well as work-based learning programmes), pursuant to the Act on education and vocational training (WEB Act). In addition, HMC offers courses and training for employees and employers in the sectors.

Box 10: Võru County Vocational Training Centre in Estonia
Võru, Estonia

VÕRUMAA KUTSEHARIDUSKESKUS

Website: www.vkhk.ee

The Võru County Vocational Training Centre is the best internationally known and recognised education institution in Estonia, offering attractive involving and flexible teaching and supporting personal growth. The Centre was established in 1999 and has about 570 students and 80 employees.

Võru County Vocational Training Centre offer vocational education to students who just graduated 9th grade as well as those who finished high school. On some vocations, it is possible to study without having basic education and in sessional teaching as well as work-based teaching. The school actively organizes different complementary trainings to adult learners.

In addition to the main buildings the school has a campus, Tech House and a Centre of Competence for Wood Processing and Furniture Manufacturing - TSENTER (http://tsenter.ee/en/). TSENTER is a network linking the public sector, private industry, and educational and research institutions, providing knowledge, skills, and best practices in materials and technologies to advance production, management, and product development in wood processing and furniture manufacturing. Focus areas for TSENTER in woodworking and furniture manufacturing are product development, finishing and production management.

3.5 Advantages and limitations of the approach

The methodological approach provides manifold advantages. First, it repurposes already existing tools by combining and adapting them to predict the impact of smart specialisation strategies on VET and skill needs. Secondly, by relying to a large extent on existing national quantitative data, the approach fosters buy-in and reduces the cost of replicating the exercise for national authorities. Thirdly, it enables identifying skill needs in a timely manner, thereby making it possible to provide rapid, relevant and targeted VET for employers in the priority areas. Fourthly, the approach enables VET policy makers to connect VET funding to the budget for the smart specialisation strategy, which is both a public and an EC funding priority. Finally, through matching priority areas, the approach fosters cross-border peer-to-peer learning partnerships as well as the internationalisation of VET and skills development in the priority areas for smart specialisation.

Despite these advantages, the assessment also has some limitations – a crucial one being the availability of data at sub-sectoral levels. In both pilot countries (Moldova and Montenegro), relevant statistics disaggregated by detailed NACE, ISCO and ISCED levels were lacking. Moreover, further disaggregation of data at regional or local levels often leads to unreliable results. Inter-regional and intra-sectoral transitions of the labour force were also difficult to spot using available statistics.

To overcome these challenges, the methodology uses multiple sources of data as well as various approaches to evaluate the information produced in order to enhance the credibility of the analyses. Assessing value, relevance and comparability is vital; moreover, in-depth qualitative research (interviews and focus groups) are instrumental in gathering more accurate views, reflecting employers' perspectives and obtaining specialist assessments on skills demand and their evolution in the priority sectors. To gain valuable insights and information, it is necessary to have access to the relevant stakeholders and to receptive public administrative institutions and companies, underpinned by the resources to adequately cover the territory and the sub-sectors involved.

Strong stakeholder engagement established during the entrepreneurial discovery process (EDP) is the backbone for implementing the methodology. There is wide heterogeneity in how regions and countries structure their EDP to fit their specific context. The identification of appropriate actors, stakeholder engagement, collaboration and buy-in to the smart specialisation strategy that the EDP generates is key for subsequent implementation of the ETF's Skills for smart specialisation approach.

Public-private collaboration accelerates the process in the ecosystem. It is important to invest in monitoring the results and to demonstrate a return on investment in terms of productive economy.

Guidance and templates

Annex 1 – Guidance on qualitative research

The qualitative analysis is an important part of the methodology, particularly taking into consideration the specific context in the EU Neighbourhood: (i) lack of statistical data and thus limited possibility for quantitative analysis; (ii) time frame; (iii) financial constraints for data production; (iv) goals and aims of the assignment.

Qualitative analysis, based on the in-depth interviews as a methodological tool, is seen as an efficient instrument and methodological approach for overviews, understanding and planning human capital in selected priority areas.

An important element in conducting interviews and focus groups is the identification of target groups/respondents. While the choice might differ from country to country, we consider the following three target groups as key for the identification of skills implications in the context of smart specialisation: (i) representatives of relevant institutions and organisations for the priority areas identified in the smart specialisation strategy; (ii) employees working in selected priority areas; and (ii) representatives of businesses operating in selected priority areas.

For the target institutions and organisations, it is important to focus on institutions in charge of development, implementation and monitoring of the relevant priority area (and/or the overall economic sector), for example central and local government institutions, education and employment institutions, social partners, representatives of professional bodies and business as well as representatives of relevant bodies, such as sectoral VET or qualifications committees.

For the target group of employees, it is important to include employees of different ages and gender, and with different education levels, positions and levels of experience in the company to ensure a multitude of inputs and thus get a fuller understanding of skills development needs.

Regarding the target group of companies, focus should be placed on representatives who make decisions related to staff employment, development and enhancement, and who also understand the needs, challenges, obstacles and direction of travel for future sectoral development. This could be company owners, chief executives, HR managers and managers of different departments (depending on the size of the company). Other important criteria in the selection of respondents include geographical location, size of the company (number of employees), turnover and other financial data, and number of years operating in the relevant field.

The research team can employ various methods to implement the qualitative study in line with specificities and constraints existing in each country, region and sector/priority area (e.g. face to face meetings, telephone, online, questionnaires, interviews, focus groups).

The questionnaires used in the testing phase are provided below.

Questionnaires – basic structure

1. **Employers and entrepreneurs**

Background information

- Company's name, number of years operating, number of employees, average turnover, export experience, etc.
- (Sub-)sectors with which the company is cooperating

Sub-sector characteristics, market, competition

- Comparative advantages of the sector (national/international level), export potential of the company and of the sub-sector in general
- Main challenges in the sector (your company), obstacles
- Innovations and changes in your company implemented so far, including investments in innovation and technology improvement, development of new products/services, experience and future plans
- Innovative potential in company/sector, investments in innovation and technology improvement

Cooperation with institutions and organisations

- Cooperation with research and academic community
- Cooperation with schools and/or training providers
- Cooperation with employment service providers (e.g. employment agency, private providers)

Human capital questions

Demand aspects

- Opinion on demand for labour (company needs, type of staff employed by the company – experienced and/or interns, vacancy situation, type of contract they offer)
- Occupational developments (current and emerging jobs/positions, occupations, competences, future needs, etc.)
- Main challenges in attracting competitive/specialised staff

Supply aspects

- Opinion on supply of labour characteristics
- Availability of training providers, quality
- Affordability of training (location, cost, etc.)
- Characteristics of the employees – education level, skills, competences, any specific occupation, needs for additional training, post-graduation labour force characteristics, investments in human capital in the company, challenges, advantages, etc.

Foreseeable changes

- How do you see the future of your company and sector in general?
- Skills anticipation (main drivers for change in the sub-sector and beyond, newer skillsets in demand, etc.)
- What is the potential mobility of the labour force between sub-sectors/sectors?
- Skills and expertise needing further development for employees (for various position levels and occupations, e.g. including managerial positions, skilled and unskilled/less-skilled positions)

General feedback

- Regulatory framework and public policies supporting innovation and competitiveness, suggestions for improvement

2. Employees

Education level and additional qualifications and/or specialisation courses

- Age

- Gender
- Geographical region for living and work (previous and current)
- Education (level of education and field), additional training followed and professional certification obtained
- Occupation (occupation over the last five years and current occupation in the company)
- Length of employment within current company

Characteristics of current job and knowledge/skills and expertise needed

- What are the key skills and competences required to perform your job? (Note for the interviewer: ask about technical/occupational skills, transversal skills and any other type of skills and competences)
- Did employment in this sub-sector require additional training, skills and competences for the position? If yes, which ones?
- What are your needs in terms of acquiring additional skills (additional training needs)?
- Are there available training providers for such skills?
- Are there any obstacles to attending such training courses (e.g. affordability, location, cost, family obligations)?

Salary levels – current level and level over the last five years

- Have you worked in another sector? If so, which one?
- Was it hard to transfer to your new sector?
- Mobility type: same profession and position or different? Same geographical area or not? Did you need additional training or not (formal or non-formal)?

3. Relevant institutions and associations

- Awareness and involvement in smart specialisation
- Opinion on sub-sector potential, challenges and advantages
- Activities that the institution carried out in the past to support development and smart specialisation research and innovation in the relevant sub-sectors (including financial resources invested)
- Future plans to support development and smart specialisation research and innovation in the relevant sub-sectors (including resourcing/financial planning)
- Opinion on activities and actions that government, businesses, academia and other stakeholders should do to support the implementation of smart specialisation and plan and manage human capital for its implementation
- Skills and expertise needing further development
- Availability and quality of training providers
- Affordability of training (location, cost, etc.)
- Mobility of labour force and relatedness between sub-sectors/sectors
- Investments in research and innovation in future
- Skills anticipation (e.g. key drivers of change, human capital implications, foreseeable occupational changes, emerging skill demands, newer and obsolete competences)
- Capacity of public and private actors to manage occupational transitions, skill changes, etc.

Annex 2 – Examples of agendas used for key foresight meetings in Rivne, Ukraine

The foresight exercise in Rivne consisted of five steps which were all carried online due to the COVID-19 pandemic.

- Step 1 is structured around a virtual meeting split into two half-day meetings with plenary sessions and group work aimed at facilitating exchanges on drivers of change and scenario building on skills implications.
- Step 2 consists of an online consultation (questionnaire) focused on skills implications, expressed e.g. as priority occupations, qualifications and transversal skills.
- Step 3 is a half-day technical meeting focused on priority needs for skills development to meet the emerging demand and policy implications.
- Step 4 is an online consultation (questionnaire) focusing on system implications, such as planning, delivery and assessment of skills development; partnerships; school-to-work transition, employability aspects; interinstitutional cooperation; centres of excellence, etc.
- Step 5 is structured as a final meeting to validate and share findings.

The basic agenda used for the three meetings (see Steps 1, 3 and 5) is presented below:

Meeting 1

Time	Description - Day 1
10:00 – 10:30	Welcome
10:30 – 10:50	Introduction Meeting objectives and agenda
10:50 – 11:10	Findings of the analysis on skill demand and supply of the 'Woodworking and furniture manufacturing' preliminary priority domain for smart specialisation, Rivne *Q&A*
11:10 – 11:55	Adressing current and future skill needs in the woodworking and furniture manufacturing sector in the Netherlands *Q&A*
11:55 – 12:05	Break
12:05 – 12:55	Session 3: External economic factors and regional drivers for change in the Rivne region *Group work* Reporting back
12:55 – 13:00	Closure

Time	**Description – Day 2**
10:00 – 10:20	Welcome

10:20 – 11:00	Adressing current and future skill needs in the woodworking and furniture manufacturing sector in Estonia (continued) *Q&A*
11:00 – 11:40	Skills implications for each scenario *Group work*
11:40 – 11:50	Break
11:50 – 12:30	Skills implications for each scenario (cont'd) *Group work: Cont'd*
12:30 – 12:45	Next steps
12:45 – 13:00	Closure

Meeting 2

Time	Description
10:00 – 10:10	Welcome
10:10 – 10:10	Introduction
10:20 – 11:00	Rivne vision in Woodworking and furniture manufacturing *Group work*
11:00 – 11:50	What skills will be required for the Rivne vision in Woodworking and furniture manufacturing to be achieved? *Group work*
11:40 – 11:50	Break
11:50 – 12:30	How will education and training provision need to adapt in order to meet the demand for skills in Woodworking and furniture manufacturing? *Group work*
12:30 – 12:45	Conclusions of group work/reporting back
12:40 – 13:00	Closure

Meeting 3

Time	Description
10:00 – 10:30	Welcome
10:30 – 10:40	Introduction Meeting objectives and agenda
10:40 – 10:45	Presentation of the results of the foresight exercise
10:45 – 11:25	Roadmap – key elements *Group work*
11:25 – 11:30	Break
11:30 – 12:10	Roadmap – who does what *Group work*
12:10 – 12:20	Reporting back
12:20 – 12:45	Danish good practice, VET in Woodworking and furniture design
12:45 – 13:00	Closure

ACRONYMS

CVET	Continued Vocational Education and Training
ETF	European Training Foundation
EC	European Commission
EDP	Entrepreneurial discovery process
ERDF	European Regional Development Fund
EU	European Union
IVET	Initial Vocational Education and Training
JRC	Joint Research Centre
LFS	Labour Force Survey
NACE	Statistical Classification of Economic Activities in the European Community
QOS	Qualifications, Occupations and Skills
R&D	Research and Development
SME	Small and Medium Enterprises
VET	Vocational Education and Training