

THE BASQUE COUNTRY COMPETITIVENESS REPORT 2019

ARE SKILLS THE PANACEA?



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The Basque Country Competitiveness Report 2019

Are skills the panacea?

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Preface

The Basque Country is a territory that is open and interconnected to the world, and which has achieved a considerable level of wellbeing. Our environment has become a place of uncertainty and profound transformation, which is changing quickly. There are threats which may bring into doubt our level of competitiveness and wellbeing, but there are also opportunities which we must leverage to improve our future situation. A short-sighted dynamic could lead us to react to each challenge individually, overlooking the relationship between them and the need to seek sustainable systemic solutions.

Positioning ourselves in response to this reality is our individual responsibility and requires a level of complex, yet necessary, cooperation. As a research institute, Orkestra seeks to provide rigorous, data-based analyses to support the decisions made, using the most suitable information possible. Consistent with our mission, the Competitiveness Report is an assessment of the situation with regard to the factors affecting the competitiveness and wellbeing of the Basque Country. It has been published since the institute was created in 2006.

Beyond the periodic assessment, there are spheres and trends which require in-depth analysis. One of these spheres is based on the premise that territories which have skilled people are more competitive and achieve higher levels of wellbeing. In line with this, as a new feature this year, the Competitiveness Report for 2019 includes a topic-specific report on skills as a resource, both individual and collective, with which we must equip ourselves in upcoming years.

The debate around skills is a complex one, affecting individuals, firms, societal stakeholders, the education sector, public decision-makers and society as a whole. The Competitiveness Report 2019 *Are skills the panacea?* deals with this debate and provides analyses that help to tackle future structural changes.

With these two reports, Orkestra seeks to serve as an agent of change, using research to make the Basque Country more competitive and boost socioeconomic development, thus fostering wellbeing among its citizens. Our commitment is to continue generating knowledge to tackle the challenges in our territory and contribute to the overall debate around competitiveness and socioeconomic development.

Lastly, I would like to highlight the work and commitment of everyone who forms part of and works with Orkestra. The institute would not be possible without our sponsors, who accompany and support us, and provide support for this open initiative, which works for our society. We hope to live up to the trust placed in our efforts by socio-economic stakeholders and Basque society in general.

Iván Martín Uliarte

Chairman

Orkestra-Basque Institute of Competitiveness

Deusto Foundation

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The report also draws on the knowledge generated through various projects carried out during the past years. We are grateful for the contribution of all the agents who have participated and collaborated in them.

Its preparation has directly involved a group of people¹ coordinated by Mikel Navarro and Miren Estensoro, with the more indirect or informal involvement of the entire Orkestra team (<https://www.orkestra.deusto.es/en/about-orkestra/team>). The members of the Board of Directors and the Advisory Board, as well as Orkestra's partner institutions, have also contributed to the report.

Additionally, preparation of the analyses included in the report was made possible thanks to data, some unpublished, generously supplied by Eustat (population and housing censuses and statistics, and the financial accounts), the Subdepartment of VET (statistics on students and graduates of VET schools), the Department of Employment and Social Policies of the Basque Government and Lanbide (Futurelan and work integration surveys) and the three universities headquartered in the Basque Country (UPV/EHU, UD and MU). To all of them we would like to express our deep gratitude.

We also give thanks for the involvement of all stakeholders who have participated and contributed to the generation of knowledge as part of the various projects carried out in recent years.

Orkestra assumes full responsibility for any errors or omissions in the content of this report.

¹ Mikel Albizu, Mari Jose Aranguren, Megan Briggs, Patricia Canto, Francisco Carrillo, Jorge Fernández, Susana Franco, Ibon Gil de San Vicente, Lorea Larrabeiti, Edurne Magro, Asier Murciego, Mercedes Oleaga, Eduardo Sisti and James Wilson. Nuria López de Guereñu also worked with this team.

Executive Summary

- The term 'skill' is understood to refer to those **personal characteristics which enable people to generate value by carrying out tasks, and which are not innate**, but which can be increased by means of learning.
- Individual skills have a clear impact on competitiveness, and therefore, on the wellbeing and social cohesion of our territory. But the system whereby they are formed is not a self-sufficient component: **it is not a panacea. It is not enough to take action on the supply side of training and education, it is also necessary to act on demand**. Therefore, both industrial/technological policy and social policy are key aspects. The Basque Country has demonstrated that, even with the obligation to take national frameworks into consideration, regional policies have some room for manoeuvre. This report considers different aspects that could be the target of proactive policies which, being characterised by their marked adaptability, increase the resilience of our territory by generating new pathways and diversifying the economic structure.
- Demand for skills will be heavily affected by **four trends that will have a particular impact on future employment**, which were included in Orkestra's Manifesto on Competitiveness: **ageing, digitisation, globalisation and climate change**. Some possible responses to these trends are: measures that make it possible to increase the labour force participation rate and employment among young people and women, training people to increase the sophistication of tasks in occupations with a medium and high risk of automation, strategic planning for the training and education needs of firms, attracting specific talent, and adapting the skills of the immigrant population.
- Of the different types of mismatches which may be found in the labour market with regard to skills, the Basque Country is notable for a **significant degree of overqualification**. This mismatch is due to the type of supply (individual skills) and the absorptive capacity of the demand side (economic stakeholders). This is a phenomenon on which we must focus our attention, due to the **economic and social costs** it generates, from the perspective of the individual (lower pay, less job satisfaction, etc.), of the firm (high staff turnover) or of the system as a whole (investment which is not profitable).

Correcting this imbalance entails promoting actions which increase the share of highly skilled occupations in the Basque productive structure, thus correcting demand for skills by firms.

- It is also common to hear warnings about the **shortfall in terms of vacancies** in certain occupations which remain unfilled. **There is no evidence of this imbalance** in the Basque Country. However, in the cases in which it is identified, it should be determined to what extent these are 'real' inadequacies, that is, which of these vacancies would remain unfilled with more favourable pay or employment conditions and by proposing more motivating professional pathways and careers; or to what extent they reflect specific skills typical of a few firms, in which case, it is the firms themselves which are primarily responsible for organising and financing the training that would make it possible to acquire such skills.
- If we accept that in current hiring activity there is a considerable overqualification mismatch, it would be logical to think that this should be corrected by increasing the weight of mid-level skills (more closely linked to VET) and reducing that of higher skills (more closely linked to the university). Based on the current profiles found in the sectors and on the sector-specific employment predictions contained in Futurelan (which highlight the loss of manufacturing employment and the rise of business services), we have estimated the future need for holders of VET and university qualifications. According to the novel procedure for analysing the degree of match between qualifications and future employment opportunities, in the future, VET would present a suitable level of overall coverage, with **some overcoverage among industrial occupational categories** and some undercoverage among the remaining categories. As regards to the university, there would be some **undercoverage, especially in the technical and economic sciences**. This change in structure and qualifications may point to the need to correct the Basque Country's weaknesses in **non-technological innovation and servitisation processes** with the development of knowledge-intensive services.
- As regards to the skill formation system, there is clear evidence of **novel initiatives that respond to trends in skill formation** and which are being carried out by universities and VET schools in the Basque Country. Even so, **there is still margin for improvement** in aspects such as fostering lifelong learning, dual education, promoting an image of vocational education and training as an alternative to general education, bringing women into vocational education and training, and support for in-house training activities by means of incentives, intermediary organisations and the development of instructor and mentor capabilities.
- The implications of the sphere of individual skills for the diversity of stakeholders in a territory are clear. This makes it necessary to strengthen spaces for **dialogue and consideration which incorporate various stakeholders and policy spheres, making it possible to tackle significant challenges from a holistic and multilevel perspective**. The involvement of various stakeholders fosters

adaptability and avoids the impediments deriving from the difficulty of transferring measures to frameworks and programmes not designed for the same purposes. This is a matter of tackling a complex challenge if ever there was one: making individuals active stakeholders in the development of the territory so that they may in turn benefit from a territory with greater wellbeing and social cohesion.

1

Introduction. Are skills the panacea?

We are seeing increasingly greater geographic mobility of factors of production due to the liberalisation of markets and advances in transport and telecommunications. The main exception to the above trend is the people who, for various reasons (family, cultural, political, etc.) still have strong ties to their territory. For this reason, tacit knowledge – which unlike formal or explicit knowledge, rests with individuals, and requires proximity in order to be transferred – is also attached to the territory. Based on this idea, organisations such as UNESCO (2005) and authors such as Reich (1991) have maintained that knowledge and human capital are the main resources on which the future wealth and wellbeing of a country depend. As capital is a highly global and mobile element, it would move towards the territory where trained people reside, and their knowledge is incorporated. Therefore, a country that has developed that factor of production with suitable education and training policies will have a unique competitive advantage, and by attracting other types of international factors of production, will report higher rates of growth and prosperity.

Territories with trained and educated people will be focal points for attracting capital

But *what* are we talking about when we refer to the concept of skills? Skills are those personal characteristics which enable people to generate value by carrying out tasks, and which are not innate, but which can be augmented by means of learning. However, the various social sciences have not always referred to them by the same name. Thus, while psychology tends to refer to these personal characteristics by the name 'competencies'; economics includes them under the term 'human capital', or refers to them in a rather general and vague manner, as 'skills' (which in the broad sense of the term as used in economics, might be translated into Spanish as *competencias*). Therefore, in the Spanish version of this report, the preference will be for the term '*competencia*' to refer to such personal characteristics. In the English version, we use the term 'skill'. And in the Basque version, the term is '*gaitasuna*'.

Skills are personal characteristics that create value and increase with learning

It is argued that improving individual skills is positive not only for the worker (who will find themselves compensated for the investment made in this), but also for the firm (which will see improvements in its productivity and innovation capacity). In other words, improving individual skills would be a paradigmatic case of a win-win game between employees and firms. What is more, an overall improvement in skill levels would also be linked, socially, to greater employability, social inclusion and fewer inequalities among the population.

Thus, education and training policies which make it possible to improve individual qualifications and skills might be seen as a sort of panacea for achieving the main economic and social goals. But are education and development policies actually a panacea for the economic and social problems facing an advanced society such as the Basque Country?

It is the aim of this report to answer that question. As we will see, education and training policies are key and absolutely necessary, and they can contribute much to achieving economic and social goals. But they are not enough, nor should they be viewed as a substitute for industrial and competitiveness policies or other social policies. It is not sufficient to have a well-trained workforce for the productive fabric and firms to automatically make good use of this. An education and training policy that provides competent and well-qualified people will lead to economic failure and great personal and social frustration if a sufficiently broad and sophisticated demand for the skills and qualifications created is not developed at the same time. And for the latter, industrial and competitiveness policies are crucial. Education and training policies and industrial and competitiveness policies are mutually dependent and complement one another. And it is not just education and industrial policies, but as we will see below, the same is true of policies that affect other key institutions or dimensions of society, such as those related to labour markets, industrial relations and systems of wellbeing.

Sophistication of demand for skills is closely related to industrial and competitiveness policies

The need to strive for complementarity and coordination among policies and respective institutions and spheres reflects the complexity which lies behind the challenge of improving skills in our society. This is the same complexity that characterises those trends or changes which are impacting or will impact the development of supply and demand of skills. That leads to the question of which ones are they?

1.1 Impact of ageing, digitisation, globalisation and climate change on skills

The manifesto prepared by Orkestra in 2016, on the occasion of the organisation's tenth anniversary, set out the ten most important challenges that would be faced by the Basque Country over the course of the upcoming decade. Four of these challenges ((1) demographic and social complexity, (2) openness to internationalisation, (3) digital economy, and (4) energy model, the environment and sustainability) are directly related to the four major trends which most recent studies mention when analysing the future of work, and therefore, of the skills necessary in the world of work: the ageing population, globalisation, technological changes which influence the automation and digitisation of production, and climate change. These trends affect both demand for and supply of skills, as well as being interrelated.

The impact of an increasingly long-lived and ageing population takes form in different ways. Firstly, a longer working life, which will require people to continue to maintain and update their skills throughout their life, especially in an environment in which changes linked to new technologies make such adaptation more pressing. Additionally, large population cohorts leaving the world of work will generate demand for their replacement. In some cases, these positions will be

filled by young people entering the labour market, in others, they will require providing people who already form part of the job market with the necessary training.

However, it is also expected that in the Basque Country, as is occurring in many other places, the demographic change will entail a net decline in the potentially active population, which can only be offset by migration flows. These migration flows are in part influenced by developments in places of origin, in aspects relating to both the ability to generate jobs, and to armed conflict, processes of environmental degradation, climate change or water shortages. The places where people choose to settle will in turn depend on the conditions offered. Attracting talent is therefore becoming increasingly more necessary, as is adapting the skills of the people who come to the territory to suit the demand.

Lastly, the ageing population is creating new business opportunities, what is known as the 'silver economy', to which the local production system can respond. These business opportunities include both goods and services, some of them linked to health and the elderly care industry. This can generate jobs in that area, especially in care, as these are considered to be at less risk of automation. The silver economy is an example of changes in patterns of consumption which can give rise to new jobs, and therefore, increase demand for different skills.

The four global tendencies generate winners and losers in employment

The Orkestra Manifesto pointed out that globalisation is a two-way path of no return and that it is therefore necessary to continue developing capabilities to increase our degree of openness and internationalisation. This is linked, firstly, to capabilities that help to attract talent, as mentioned above. However, it also includes capabilities to position ourselves favourably in value chains, as globalisation entails a fragmentation of production processes, with different links located in different countries.

Globalisation, in part linked to processes with greater automation and digitisation, can give rise to greater specialisation. If this influences changes in the sectoral structure of the economy, there will be demand for different skills than those which previously existed. Thus, some studies note that in developed countries, the share of employment in manufacturing industries is falling, while that of services is rising. This trend has also been confirmed for the Basque Country (see Subsection 3.4). Firstly, this is due to shifting some parts of production to third countries (off-shoring), especially those parts that require lower skills. Secondly, situations are emerging in developed countries to retain and create employment opportunities linked to industries with greater added value or advanced services that require higher skills. This may give rise to shifting production back to developed countries (re-shoring) to take advantage of innovation environments and access to these markets.

Despite the fact that analyses of the future of work largely centre on the effect that new technologies, automation and digitisation will have on employment, the net impact that will occur is uncertain. A recent OECD study (Nedelkoska and Quintini, 2018) points out that 14% of jobs in OECD countries could disappear as a result of new technologies. However, new jobs and occupations will also be created (big data analyst, community manager, etc.), as statistics for the last decade show. Nonetheless, as Ballister and Elsheikhi (2018) note, the potential for gener-

ating new jobs has not been adequately dealt with in recent studies, as it is easier to predict how existing jobs may change than it is to imagine what new jobs may exist in the future.

What is clear is that the tasks carried out by the different occupations are going to change. The most routine tasks (both manual and non-manual) run the greatest risk of automation, while there will still be demand for people who have the capabilities to solve problems and for interpersonal relationships. Generally, fewer routine tasks are associated with higher-skilled jobs, but there are also non-routine tasks in jobs classified as low-skilled, such as those already mentioned within the care industry, which are expected to continue to grow. In any event, technological advances are making it possible to automate the most complex tasks, largely changing the capabilities necessary to carry out jobs. These processes require people to have the necessary, and constantly changing, capabilities to continue producing innovations, higher productivity and inclusive growth.

Although they are not the only reason, new technologies are also helping to create new models of labour relations and forms of non-standard work. This is made possible, in part, by the so-called uberisation of the economy, or the gig economy, which allows people to establish relationships via digital platforms to hire certain services. At this point, these types of platforms only generate a limited portion of the jobs which require skills associated with high levels of education (for example, few people in charge of the technical tasks on the platforms, compared to a large number of Uber drivers or Globo delivery staff). However, it is possible that these business models will expand into areas that require more advanced skills in the future (OECD, 2017).

Self-, temporary and part-time employment is increasing, along with inequalities between workers

In any event, it is expected that self-, part-time and temporary employment will become increasing more prevalent. This may lead to more job insecurity and make capabilities associated with entrepreneurship, resilience, creativity and adaptability more and more important (OECD, 2017).

A fourth megatrend which was included in the Orkestra Manifesto is climate change. According to various analysts (Balliester and Elsheikhi, 2018; OECD, 2019), it will affect the quantity and make-up of employment. It is common to refer to the 'green economy' (or aspects of the same such as renewable energies or the 'circular economy') as a source of new jobs which, like the 'silver economy', may offset the job losses resulting from automation. But we should not ignore the fact that climate change will also require transitioning to new modes of production, transport and mobility that will entail significant changes in the make-up of employment. The transition to electric cars, for example, will generate new jobs at those firms which manage to successfully break into this business. However, as an FTI report (2018) shows, it will also cause job losses in firms currently linked to traditional motor vehicles. In other words, energy transitions will produce both winners and losers. In the case of mobility, it will be as likely or more likely for an economy to be affected by the second factor when there is a greater share of transport equipment industries in its employment structure, and when there is less preparation and positioning at the forefront of this transition. Alternatively, new employment opportunities may be generated in sectors associated

with equipment manufacturing for power distribution networks, which are shaping up to be a key element of the energy transition.

One important factor of how these trends take shape is linked to another of the challenges in the manifesto: business resilience. It is on the behaviour of business (adopting new technologies, intensifying servitisation, production of new goods and services in response to changing consumption patterns, adaptation to highly flexible conditions of production, and in short, evolution towards new models of business organisation) that demand for skills in the territory will largely depend (see Subsection 4.5). These changes in business organisation will in some cases be motivated by the trends described, but will reflect the strategies pursued by business owners and managers. For this reason, it is important for them to have the necessary capabilities to implement these strategies, also taking into account that the models that involve the greatest participation by workers will also make it necessary for them to develop new capabilities, such as communication (Green, 2016).

Changes in employment are the result of external global trends, but also of the strategies pursued by firms

The response will go hand in hand with learning capacity. As we will later see, this entails changes in the system that make it possible to adapt the supply of capabilities, at both educational institutions and in business itself. Nor should we lose sight of the challenge of the Basque Country's progress to contemplate the wellbeing of all people and social cohesion. This means that it is also necessary to bear in mind how these trends are going to affect different groups (men vs. women, people working in standard jobs vs. non-standard jobs, locals vs. people born elsewhere, etc.).

This consideration of trends thus offers proof of the importance and urgency of doing work in the realm of skills. The analyses included in this report address that question. But the question lies as to what end and for whom should analyses of the current and future need for skills be carried out?

1.2 Studies of qualifications and skills needs in the Basque Country

Analyses of possible developments in jobs and skills seek to guide the different types of education and training providers – firms, government bodies offering initial vocational education and training (VET) and vocational education and training for employment (VETE) and universities – in defining their training and education offerings.

According to the results obtained by Navarro *et al.* (2018) for firms in Navarre, extrapolatable *mutatis mutandis* to Basque firms, one third of firms with five or more employees lack any assessments of training needs. And of those that do have them, just 15% use outside associates to carry them out. Of those that provide training, over 40% develop it when the need arises, another similar percentage according to annual plans, and just 11% have long-term training strategies. Both having assessments (especially if outside consultants are used) and strategic planning for training correlate positively with the firm's size, industry, innovation and internationalisation.

The firms that have made the most progress in training are large, innovative and internationalised

In the Basque Country, there have been public programmes which, at certain times, have funded assessments of this kind (for example, Hobetuz programmes between 1996 and 2012). There was even encouragement for some VET institutions (Goierri Eskola and Machine Tool Institute, for example) to develop needs assessment tools at SMEs, which could then be accompanied by training plans. But the little inclination on the part of firms to hire this type of services externally was joined by the fact that they did not view VET institutions as providers of the same. Nor did the support programmes for preparing assessments produce great results. There are currently no programmes of this type in operation.

There are three main factors which have an influence on the supply of VETE by government bodies (Lanbide, essentially). Firstly, the need for personnel with certain skills in the job market. Secondly, the demands or interests of people who enrol in such activities, whose tastes may differ from those which would ensure their employability. Thirdly, the training providers themselves will try to offer the activities for which they already have resources or which are most profitable for them, and perhaps not those which, although necessary, require them to make investments ('provider capture', Raggat and Williams, 1999).

To learn about and address the needs of the job market, in 2017, Lanbide developed a VETE assessment and planning system based on different criteria (integration and employment rates, etc.). This enables it to identify and select the training specialties to be offered in a more planned fashion compared to that of the other autonomous communities. However, its assessment is solely short-term. Being aware of this fact, with the aim of covering the lack of long-term needs forecasts, in collaboration with Ceperede, Lanbide has developed Futurelan, a tool which offers employment projections for economic sectors and occupational groups in the Basque Country up to 2030 (see Subsection 3.3). However, these do not translate into employment projections by level or type of education, or by skills.

In the supply of initial education and training (both VET and university), the demands of students (and their families) also have a considerable influence. Unlike VETE, this demand is focused more on the long term and influenced by the symbolic function of qualifications in our society (Planas, 2011), and by matters outside pure economic rationality that are more sociological and cultural in nature (Raffe, 2011). The responses of VET institutions and universities also require longer periods, especially universities.

In the case of initial VET, in addition to the existence of a minimum level of demand from students to initiate a vocational course, the government considers the work integration rates for that course (including commitments by firms to the same) and the system's current capabilities to present it. This exercise is carried out annually and takes short-term factors into account. Although work integration rates are generally higher in industrial occupational categories, this varies considerably according to the level of the course (basic, intermediate or higher) as well as the specific course. As a training programme most directly emerging in response to demand from the productive fabric, mention should be made of dual VET specialisation programmes.

Universities have more independence than VET schools in deciding on their educational offerings. Partially due to this, internal inertia plays a greater part in

their offerings and implementing new programmes requires more time. For this reason, the lack of prospective studies has an even higher impact than that of other stakeholders. In addition, in having an organisation highly divided by subject area, needs are detected more for specific subject areas than in response to global approaches.

Needs assessment studies are of interest to these three types of supply-side stakeholders. Mention has already been made of some of those which the Basque Administration providing VETE carries out on its own (as well as those conducted by the State Public Employment Service, SEPE). But the government has also promoted the use of other stakeholders to carry out studies (e.g., the Hobetuz programmes to conduct sector or cluster analyses). Whether relying on this funding, or on that granted by other types of programmes (European, for example), or on their own resources, there are several reports that provide snapshots of the situation in certain sectors.

On a more general or intersectoral level, and setting aside studies such as the *Informe Infoempleo* (Infoemployment Report) published annually by Adecco, those published by Confebask are worth pointing out. Based on surveys of their member firms, this business organisation published *Necesidades de Empleo y Cualificaciones de las Empresas Vascas* (Job and Qualification Needs of Basque Firms) in 2016 and 2018. However, they only deal with short-term needs.

In smart specialisation strategy (RIS3) and cluster association steering groups, the issue of worker skills is of primary concern. The most thorough initiative for tackling it is the Advanced Manufacturing Steering Group (AMSG), which has prepared a map of the technologies that will have an impact on the energy, aeronautics, motor, machine tool, and electronic and information technology industries in the medium to long term (2025). With the participation of the Acicae, Hegan, AFM and Gaia associations, technical and cross-cutting skills 4.0 which will change as a result of the impact of technology were identified, and the professional profiles in the greatest demand were determined. The results of this analysis were then compared with the current catalogue of training options, primarily VETE and university (through dialogue with the 4Gune Cluster; see Box 6). The short-term aim is to design plans for training activities suitable for continuing education (specialisation stages or courses). In the medium term, the AMSG has proposed that these conclusions should be considered for inclusion in degree curriculums (master's, undergraduate), to which end a dialogue has been initiated with key stakeholders such as Confebask, the Basque Institute for Vocational Training Knowledge (IVAC), Lanbide and the Basque Department of Employment.

In short, there have been numerous initiatives seeking to assess and detect existing needs. Training providers have made their decisions taking these somewhat into account, although they have also based such decisions on criteria outside those needs (that is, based on student demand and their own interests in maintaining their activity). Three main recommendations can be reached as a result of the foregoing analysis:

- One, it would be advisable to clarify and organise the framework for identifying needs. Although theoretically, there is a link between qualifications and skills, as the frameworks for current qualifications are defined in terms of skills,

Identifying training and education needs requires clear skills frameworks

most reports and assessments refer to qualifications required (especially types of studies and degrees/diplomas) and not as much to the skills linked to them. Furthermore, there is no clear common framework of skills shared with those primarily used in international studies which is being employed by all stakeholders. This lack is especially clear in approaches undertaken by stakeholders that are not part of the educational world.

- Two, the majority of the needs analyses and planning for training and education offerings are short-term, meaning that there is a lack of long-term research into needs and training and education planning. This issue is particularly serious for stakeholders in the education system (and especially for universities), which require a lot of time to adapt their qualifications. Futurelan has made an important contribution by providing projections for employment opportunities and occupations up to 2030, but these projections still need to be translated into qualifications and skills. Additionally, although the AMSEG has attempted to predict the personnel needs of firms within the scope of Industry 4.0, its approach does not encompass other spheres. This was also done without the participation of all stakeholders in the education and training system, and without a suitable methodology and conceptual framework.
- Three, the majority of these initiatives have been carried out in isolation, without coordination – and on some occasions, even without knowledge – of such efforts. It is of the utmost urgency that we coordinate efforts in this sphere, given that, as all stakeholders form part of the education and training system, what one does substantially affects the others.

1.3 Content of the report and methodology

In the introduction we highlighted that, while they are not a panacea, skills are a key component of the competitiveness of the Basque Country and must be accompanied by other industrial and technology policies. This fact has been accentuated by the trends considered above, which are affecting the development of skills. Furthermore, the analytical inventory of the various initiatives and studies carried out at the Basque Country level shows that they lacked a more long-term perspective which takes into account the role of all the stakeholders involved in the skills system. The analysis contained in this report therefore offers a holistic and long-term view, concentrating on the territory as the main unit of analysis.

In the following section (Section 2), we discuss in detail the conceptual and analytical framework on which the results contained in the subsequent sections are based. The aim is to one, present the different approaches to consider the concept of skill, as there is still no consensus as to what constitutes a skill, and the different types of existing skills. Two, we further explore the challenges entailed in their measurement and the mismatches they present, which are the object of analysis in this report. Next, we make reference to the need to develop a more unifying approach to the skills system (the group of organisations and institutions which have a determining impact on their generation), which takes account of their interactions with other types of institutions, and which considers the uniqueness of each context.

Section 3 contains an analysis of employment and occupation trends in the Basque Country, detailing the skills and training/education needs deriving from these. In addition, and particularly in the occupation analysis, the trends described above and included in the Orchestra Manifesto are taken into account.

Having laid out the needs and challenges deriving from the empirical analysis, Section 4 presents the trends and challenges in the skill formation system. It begins by presenting the typology reflected by the Basque case, and then delves further into the unique set of problems facing each of the main stakeholders in this system: the university system, the VET system linked to educational establishments, and the provision of training by firms.

Tackling training and education challenges requires the collaboration of all stakeholders and a long-term perspective

Below is a list of the sources and databases used for the analyses in sections 3 and 4:

- Cedefop. Forecasting skill demand and supply. Detailed forecasting data.
- Eurofund. European Working Conditions Survey.
- Eurostat. General.
- Eurostat. Adult Education Survey, Continuing Vocational Training Survey.
- Eustat (Basque Statistics Office). General.
- Eustat (Basque Statistics Office). Censo de Población y Viviendas (Population and Housing Census).
- Eustat (Basque Statistics Office). Directorio de Actividades Económicas (Economic Activity Directory).
- Eustat (Basque Statistics Office). Estadística de Población y Viviendas (Population and Housing Statistics).
- Eustat (Basque Statistics Office). Population projections.
- Fundae (State Foundation for Training in Employment). Statistics.
- National Statistics Institute (INE). General.
- Valencian Institute of Economic Research (IVIE). U-Ranking of Spanish universities.
- Lanbide. VET activities for the unemployed and employed.
- Lanbide. Futurelan.
- Ministry of Science, Innovation and Universities (MCIU). University statistics.
- Ministry of Labour, Migrations and Social Security. Anuario de Estadísticas (Statistics Yearbook).
- Ministry of Labour, Migrations and Social Security. Encuesta Anual Laboral (Annual Labour Survey).
- Ministry of Labour, Migrations and Social Security. Job market policies. Vocational education and training and measures supporting employment.

It is important to note that the analyses of these sources were supplemented by twenty-seven interviews with: representatives of public entities such as governments, county development agencies and other entities for innovation and development; cluster associations and firms; and VET schools and universities. Lastly, the report includes a section with final conclusions and recommendations deriving from the analyses contained therein.

2

Conceptual framework for analysis of the skills system

2.1 Approaches to the concept of skills

For economics, skills are a major determining factor of economic growth, of competitiveness and of income distribution; for sociology, they are the foundation of social classes and the labour process; and for psychology, they are a fundamental concept in professional education and qualifications systems, as well as human resources management. For this reason, the three social sciences mentioned have dealt with their analysis and all three have made important contributions to their fuller understanding. Unfortunately, in general terms, the analyses carried out in the three disciplines have only covered current issues or debates within their own framework, leaving aside other important issues and not considering the contributions of other disciplines or incorporating them into their analyses.

Skills determine the growth, competitiveness and cohesion of a territory

Thus, economics has dealt with explaining investment in training and education, and how it must be financed. It has introduced the distinction between general and specific human capital (which is very important for the transferability of these skills from one firm to another and for explaining who should finance the investment in training). However, it does not concern itself with the specific content of the skills (an essential matter when seeking to take practical action), ignores the social context of skills (an issue which determines the acquisition, assessment and use of the skills) and considers technology and worker preferences to be exogenous or given (so that it is not possible to act on the factors which affect them).

Sociology has dealt with the complexity of tasks and the autonomy of the worker in all this, as well as the social construction of skills (given that, in addition to market values, power relationships are considered to affect the development and employment of skills). However, sociology has difficulty measuring that task complexity, as well as explaining the economic value of skills.

Lastly, psychology offers analytical frameworks for skills (classifying them, for example, as cognitive, functional or social), which make it possible to compare and break down heterogeneous jobs and qualifications, and focuses on how those skills are acquired (that is, on the process inputs). But it does not go into economic analysis of those inputs, let alone the economic and social outputs of the above.

Depending on the social science from which the issue is tackled, to this diversity of approaches, we must also add distinctions according to the country where such analysis is undertaken. Thus, for example, in the United Kingdom, the main focus is on practical skills (skills in the strict sense of the term) which must be utilised in performing the specific tasks of an occupation, so that the basic concern has been to set standards for each occupation. In Germany, by contrast, the approach to the term skill is more holistic, and in addition to practical or functional abilities, cognitive and social skills are also taken into consideration. Additionally, the desired aim is not just efficient performance in an economic occupation, but also an appropriate individual and social development for people. For this reason, what a British or a German person understands by the term skill may vary substantially.

From the preceding, it is possible to conclude that, although economic requirements and competitiveness must occupy a key position when it comes to determining what level and make-up of skills are to be developed, such a determination must also take into account personal and social aims and factors which extend beyond those. For this reason, there is a need for forums or spaces which make the joint participation of representatives of different interests possible, and which incorporate experts from different disciplines (economics, sociology, pedagogy/education, etc.). This has not been the case in the Basque Country, as it is possible to see in Subsection 1.2 of this topic report, where we offer an inventory of the initiatives which have been carried out around determining the skills which it would be necessary to promote in this autonomous community. While praiseworthy, existing initiatives have sought to identify the skills required essentially by economic development and have in the majority been carried out without incorporating different types of stakeholders and experts from the different disciplines. Therefore, if the skills necessary for the future are determined by representatives of business, independently of other stakeholders and without incorporating those from the education system from the start, in addition to overlooking key dimensions or aims which should be considered in developing skills, they will generally lack the frameworks to enable or facilitate their integration into the education and training processes which the second type of stakeholder carries out. Consequently, it is highly likely that the skills determined in this way will not ultimately be transferred to training processes at institutions, or this will occur only partially and following long and complicated processes of adaptation.

Identifying skills requires multi- and transdisciplinary efforts

2.2 Skill typologies

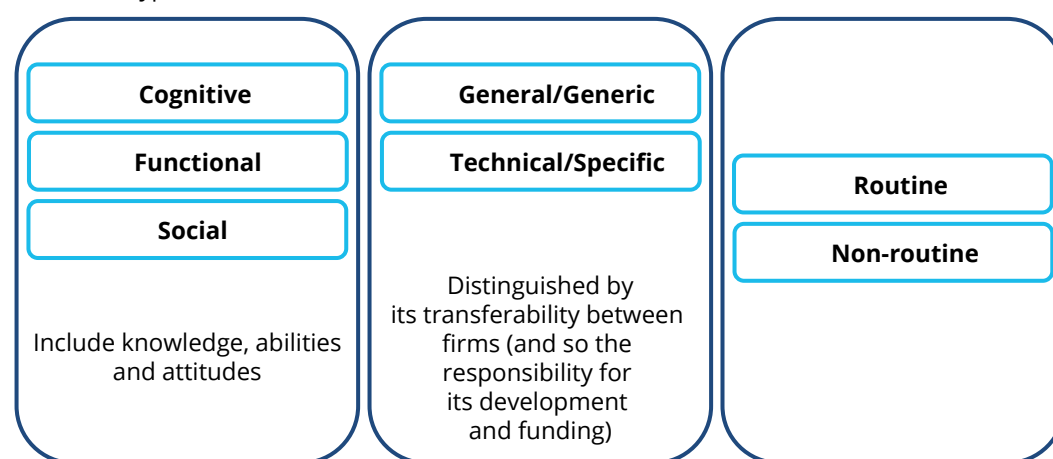
In general, although serious barriers between the different approaches still persist and there is no complete consensus on what constitutes a skill, we are seeing a general tendency towards expanding the concept of skill, and likewise, towards the different approaches being enhanced by and incorporating contributions from the others.

To gain a fuller knowledge of skills and their economic impact, and for the resulting implementation of policies related to them, it is essential to distinguish between the different types of skills. From all of the existing skills, three types have been selected for this report, and are shown in Graph 1.²

Properly distinguishing between the different types of skills will help with designing appropriate policies

² These three large categories are sometimes referred to by slightly different names. In the particular case of economists, it is common to distinguish only between cognitive and non-cognitive skills (that is, those corresponding to attitudes, norms, behaviours and other traits).

GRAPH 1 Types of skills



Although the distinction between cognitive, functional and social skills (with their corresponding subcategories) may seem abstract or merely theoretical, if the approaches to identifying skills are not based on well-established categories in the literature, international comparison and determining where the Basque Country is situated will be impossible, as the skills in different places will be expressed and measured in different ways. And what is more, if the typologies and nomenclature of skills are not shared by the various stakeholders that make up the skills systems, the determination of the needed skills carried out by the business sector will be difficult to incorporate into the training and education processes undertaken by educational institutions. Unfortunately, beyond the Basque Framework of Vocational Qualifications and Specialisations, the Basque Country does not have or does not use a shared framework for the classification of skills, one which might also be in line with those employed by international organisations such as the OECD, which perform international comparisons around skills needs for employment positions.³ This makes it more difficult to ascertain the relative position of the Basque Country in each type of skill, as well as exploitation or integration by other stakeholders of the skill identification carried out by each type of stakeholder.

Development and funding of specific skills is the responsibility of firms

Additionally, the imprecise distinction between general and specific skills leads to firms demanding that the education sector develop skills which correspond strictly to them, as they are not transferable to other firms. Another result of this, which occurs in some Spanish autonomous communities, is that dual in-house training is proposed as a substitute, when it should be primarily supplementary, as is the case of Basque dual VET (see Subsection 4.4). Likewise, the distinction between routine and non-routine is essential for estimating the possible impact of automation on occupations (a point which is discussed in Subsection 3.2.2).

The distinction between routine and non-routine skills is essential to estimating the impact of automation on employment

2.3 Measuring skills and their mismatches

It is not easy to measure skills. As a result, analysts usually resort to indicators or indirect measurements of these. Thus, for example, because the data are easier

³ See the results of the OECD's ILOSTAT database, on Skills for Jobs. In addition to data by country, this database contains data for regions in one set of European countries, which does not include Spain.

to obtain, in order to determine a worker's skill level, there is a common tendency to use indicators relating to their educational level (e.g., highest level of education completed or years of schooling) or to the occupation to which their position corresponds (i.e., depending on the position's occupational group, it is classified as high-, medium- or low-skilled), or the pay they receive (considering that those who receive higher remuneration will have more qualifications), or their years of work experience, etc. In some countries, experts have tried to identify the skills required for each occupation. This literature has been particularly influenced by the task analysis and skills identification of the different occupations carried out in the United States as part of the O*NET project. And lastly, there are the initiatives to directly measure individual skills, such as those launched by the OECD, the Programme for International Student Assessment (PISA) and the Programme for the International Assessment of Adult Competencies (PIAAC).

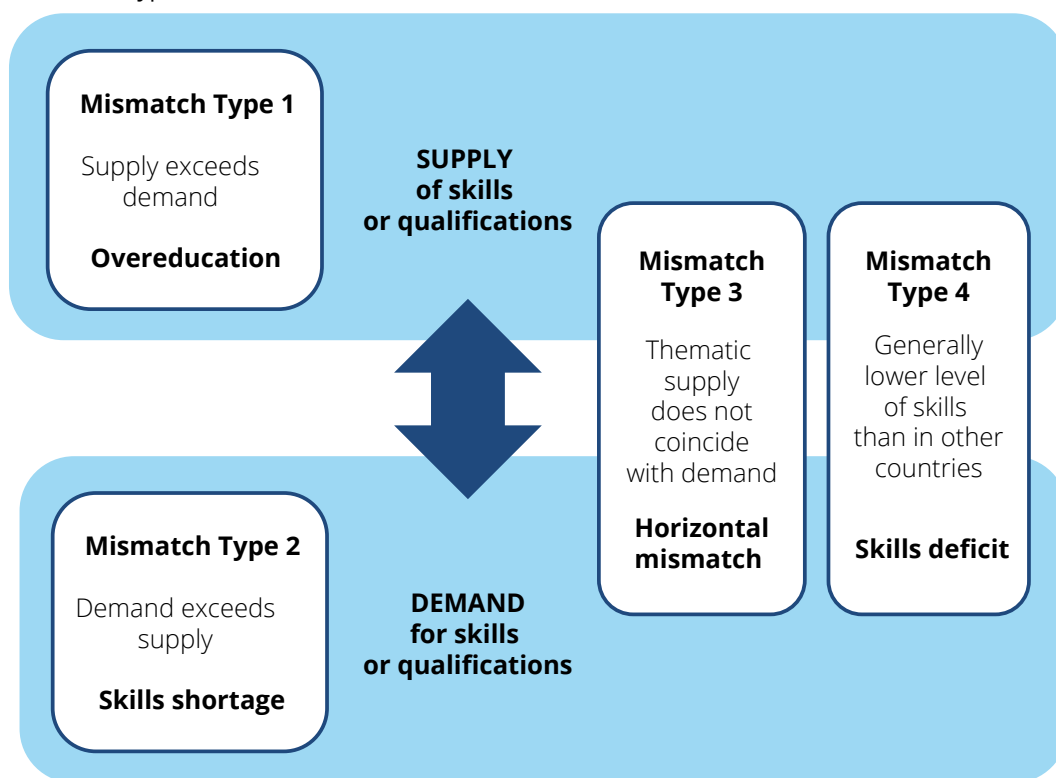
Based on these measurements and indicators, the analyses seek to identify any possible imbalances or mismatches in skills that may exist in the labour market. However, as skills have different dimensions (cognitive, ability-related, attitudinal), there being different ways to measure skills (some more based on qualifications or education levels and others on the skills in themselves), and being able to measure the degree of adjustment on different levels (at that of the worker, at that of the position or firm, or at that of the territory), mismatches may relate to a considerable number of dimensions. As a result, there may be a different indicator to measure the mismatch in each one of them. Furthermore, studies show that the levels of mismatch in the different dimensions are weakly correlated, so that it is not enough to look at a single indicator to draw conclusions about the extent of the existing mismatch. It is also important to properly identify the type of mismatch, as the effect or impact which one or the other may have is very different. And furthermore, the policies to correct them must be different.

In order to achieve the combined aims of one, avoiding excessive methodological explanations, and two, not giving up on including the multidimensional nature of the mismatches in skills in the labour market, here we will concern ourselves solely with the most important types, for which there is evidence and the possibility of analysis.

As Green (2016) rightly states, one suitable way to organise the different indicators of mismatches is by looking at the relationship established within them between supply and demand.⁴ Graph 2 shows the types of mismatches explained below.

⁴ Although in some papers there is a tendency to group all of these indicators which seek to measure the degree of disconnect in skills, qualifications or fields of study under the term 'mismatch', as the OECD indicates (2017), in reality the term 'mismatch' should refer only to some of them, and in the case of others, we should be speaking about shortage or surplus, about a gap, etc. In response to this, the OECD opts to encompass all of these situations of shortage, surplus, mismatch, etc. under the term 'imbalance'.

GRAPH 2 Types of skill mismatches



The first type of mismatch occurs when the supply of skills or qualifications exceeds the demand. The best-known indicator in this regard is overeducation,⁵ which occurs when the education level of the worker is higher than that required by the position. This is a phenomenon to which analysts attribute great importance, both because it is a relatively frequent occurrence (especially in the least developed countries, where there are fewer highly skilled employment opportunities) and because the economic costs of overeducation are obvious, whether this is approached from the perspective of the individual (lower pay, less job satisfaction, etc.), of the firm (e.g., higher staff turnover), or of the system as a whole (investment which is not profitable). Paradoxically, as McGuinness *et al.* (2017) note, overeducation is one of the mismatches to which governments pay the least attention and take the fewest measures to correct. For, as Keep and Mayhew (2016) point out, maintaining the idea that the more education the better appears to have become a sort of gospel. However, all of the aforementioned being true, as Green and Henseke (2016) indicate, even so, graduates are still paid more highly than non-graduates, the social returns deriving from higher education are greater than those without, and above all, individuals and society may be seeking something more than access to a job in higher education. In any event, the solution would not entail simply introducing the *numerus clausus*, putting more restrictions on tertiary education, or improving career information and counselling mechanisms, but rather

Policies should pay more attention to overeducation

⁵ Some authors prefer to use the terms 'overqualification' or 'underemployment' to avoid the pejorative image of education conveyed by the other term. Other indicators, mentioned less often in the literature, would be the underuse of skills (which it usually tries to measure using subjective assessments via surveys) and unemployment of skilled workers (easy to measure using workforce surveys).

– and primarily – it entails the development of industrial and technology policies which increase the number of jobs that require greater qualifications.⁶

The second type of mismatch appears when demand exceeds supply. The most common indicator in this regard is skills shortage, which is generally measured as the percentage of vacancies for skilled workers which firms are unable to fill. In any event, as all analysts underline, the percentages usually made public by the business world in this regard do not normally reflect the actual shortage, because that inability to fill the vacancies is often due not to a lack of people with the proper qualifications in the marketplace, but to the fact that firms do not want to offer the pay or provide the working conditions to which such workers are entitled. As McGuinness *et al.* (2017) indicate, this is one of the imbalances for which the least real evidence exists, and yet, it is among those with which policies are most concerned.⁷

A third type of imbalance occurs when supply does not coincide with demand, not so much due to the overall level of supply and demand for skills or qualifications, but because the occupations in which people are employed are not related to the fields of study they have pursued. This type of imbalance is known as ‘field-of-study mismatch’ or ‘horizontal mismatch’.

Lastly, there are cases in which at the country level there is no clear mismatch between supply and demand for skilled workers, but comparison of the degree of skills and qualifications which employees in that country have and that held by those in other countries with a similar level of development shows that the degree of skills and qualifications is clearly suboptimal. For these cases, Green (2013) proposes the term ‘skills deficit’. One paradigmatic example of this is the United Kingdom, where both the skill level of the workforce and the skill level of existing occupations are clearly lower than those in the majority of the central and northern countries of the EU-15. In this regard, it is common to speak of the United Kingdom (or countries that fit this model) as following a ‘low-skills road’ or have a ‘low-skills equilibrium’. And, as Keep and Mayhew (2016) and Green and Mason (2014) rightly note, in these cases of skills deficit, the solution does not only entail committing to a determined improvement in education and training offerings and to revamping institutions and investing more resources in them, but rather an equally or more decided commitment to stimulating demand for these skills and qualifications among firms, by means of active industrial and technology policies.

With regard to the four mismatches discussed, as stated in the benchmarking volume of the Competitiveness Report, the Basque Country is among the European regions with the highest ranking in the overqualification index. And given its importance and the high costs this entails, according to the literature, this should be corrected.

⁶ As Green and Henseke (2016) show, the main explanatory factor for differences in levels of overeducation in the 21 OECD countries included in their studies is the relative demand for high skills found in those countries.

⁷ When supply is less than demand, not in vacancies, but in internal positions within the firm, rather than a ‘skills shortage’, we talk about a ‘skills gap’. In theory, this is not very important, as the business owner could correct it by either training the employee or dismissing them. And when the imbalance in vacancies is related not to skills, but to the education level required for the position, we talk about ‘undereducation’. This is another less frequent imbalance, to which the literature pays less attention.

There is little evidence concerning real shortages due to unfilled vacancies

The Basque Country is among the European regions with the highest mismatch due to overeducation

It is also quite common to find reports, such as those by Confebask or certain cluster associations, which warn that many of the vacancies posted by firms remain unfilled (see the inventory of needs assessments in Subsection 1.2 above). However, regardless of the fact that such reports do not present forecasts for future skills shortages, the literature reviewed in this subsection questions the real extent of skills shortage revealed by such studies, when they do not take into consideration that there may be vacancies due to the pay or working conditions offered for these positions.

Concerning the third type of mismatch (that is, between the fields of study undertaken and those needed by the productive fabric), there are no robust studies for the Basque Country, beyond the conclusions which may be derived from studying the work integration rates of the different types of graduates based on data published by Lanbide, or again, from the analyses included in the Confebask studies on the hiring needs of its firms. In fact, to deal with this inadequacy the exercise in Subsection 3.3 was carried out, for the first time in the Basque Country and using a novel methodology developed by Orkestra: analysis of the match between training and education offerings and the need for holders of qualifications in different fields of study, derived from the employment prospects for 2030 produced by the Futurelan model.

Lastly, the fourth type of mismatch (skills deficit) does not seem to be found in the Basque Country because, as indicated earlier, the main problem here lies in over-qualification. However, the two problems have in common that the key to solving them also entails industrial and technology policies which stimulate demand for higher skills, so that countries with successful experiences in solving this fourth mismatch may constitute a source of learning for the Basque Country.

In comparison with other territories, the Basque Country does not have a skills deficit

2.4 The skills system and how it complements other spheres

As we have mentioned, the approach to the concept and typology of skills varies from one place to another, just as the situation in terms of supply, demand and mismatch does. This is due to the fact that these contexts are a reflection of a skills system (that is, of a set of organisations and institution which have a determining impact on their generation and use) which is unique from one place to another. In fact, although also influenced by international dynamics or trends which are shared with systems in other places, skills systems fundamentally reflect long historical processes unique to each country or autonomous community.

However, in order to transcend the particular and fragmented view that would derive from analysing these skills systems one by one, and to facilitate the comparison and benchmarking between systems, various authors have tried to develop typologies for these. The typologies that have been created for education and training systems are quite numerous: some with an educational or pedagogical perspective, and others with a more social and labour viewpoint.⁸ Less common are those which go beyond the education and training system (also frequently limited to initial education and training), paying more attention to the impact of the labour market and economic institutions on generating skills (for example, that produced by Ashton *et al.*, 2010).

⁸ See Saar and Ure (2013) for a review of these typologies.

Analysts also began to observe that the type of skills system found in a country usually appeared associated with the type of production system in existence there. In the 1990s, for example, an entire literature was developed which, comparing especially the British case with the German, tried to explain the poorer performance of the first in productivity, quality, innovation and international trade by means of the lower level and system of skills exhibited by its workforce.⁹ But we also began to see that, depending on the productive and innovation structure of a country or a firm, its demand for qualifications and skills varied considerably, so that it exercised a different pull effect on its skills system (see Pavitt, 1984; Tether *et al.*, 2005). This is what led to early arguments that one, industrial and technology policies, and two, education and training policies, should operate together.

Another step forward towards a more unifying and all-encompassing approach came with the appearance in the early years of this century of the varieties of capitalism (VoC) school (Hall and Soskice, 2001). This approach underlines the institutional complementarities that are found among a country's educational institutions, regimes of production, industrial relations and labour market regulations, and social protection systems. Busemeyer and Trampusch (2009), in particular, propose shedding the limits of skills systems, and rather working with the concept of skills regime, which would try to capture those institutional complementarities and make reference to the interconnected set of education and training institutions, of industrial relations and labour market policies, and of the welfare state that make up the incentives for workers and firms to invest in different types of skill formation.

There are several general lessons which can be derived from the VoC literature (including the critical reviews that have been carried out from it). First, the advisability of not ignoring the mutual influence between the skills system and that other group of spheres mentioned above. Second, that there does not exist an 'optimal' system (e.g., the Anglo-Saxon liberal market economy) which countries should attempt to approximate. Rather, different varieties exist which may make economic growth possible, although the results of this (in terms of dominant industries, degree of equality, etc.) will certainly be different depending on the variety followed and the consistency achieved among the different spheres, which make some systems more functional than others. Third, that global trends (internationalisation, technological progress, etc.) exert their effects through that complex set of spheres, on which, although they demand changes in order to remain functional, such changes do not lead to the disappearance of unique national features. Fourth, that the systems are not static, but rather, in addition to the global trends and external factors which impact them, there are internal conflicts and contradictions driving their transformation. And lastly, that within a national skills regime we may find significant variations, both geographic and sectoral or business-wise (that is, according to region or local system, to sector, to firm size, etc.).

As regards to more specific lessons for the Basque and Spanish cases, we should begin by pointing out that VoC analysts tend to classify the prevailing model in Spain as a particular case of the Mediterranean variety (Vallejo-Peña and Giachi, 2018) or of mixed market economies (Molina and Rhodes, 2007). As a result of this mixed nature, the Spanish case is characterised by greater inconsistency among the different spheres and a greater absence of complementarity. Insofar as regulation of some

There are no optimal skills regimes, but they can be more or less functional depending on their inter-institutional consistency

⁹ See a brief presentation in Toner (2010 and 2011).

of those spheres (for example, regulation of adjustments and features of the labour market) is determined at the national level, the assessments made of the Spanish system are partially applicable to the Basque case. However, the Basque case is one of those which would justify the criticism of VoC, that it does not take sufficient account of the differences or variations existing within each state. In fact, based on the high degree of decentralisation of powers achieved, the Basque Government and Confebask sought to strengthen the existing complementarities between industrial policy and the VET system. Unique benchmarking exercises were carried out in order to adapt best practice cases developed in other EU countries to the Basque Country, in the areas of qualifications framework, dual training, combined VET school, etc. (see López-Guereñu, 2018a and Box 5).

The Basque Country has worked to strengthen complementarities between education policy and industrial policy

3

Development of employment and skills in the Basque Country

This section is based on an analysis which evaluates the role of the labour input in productivity growth in order to determine the place this input occupies in economic growth. The section then delves into the impact which the four trends presented earlier have on employment and individual skills. It then goes on to consider the degree of match between the supply of graduates and employment opportunities expected for the future. To conclude, we focus on the county level with the aim of detecting the possible effect of the forecasts made on the sub-regional plane.

3.1 Breakdown of productivity growth

As indicated earlier, the main focus of economists on the subject of skills ('human capital') has consisted of evaluating the role which the labour input plays in economic growth and apparent productivity of labour. To do so, the procedure known as 'growth accounting' is used. In the case of the apparent productivity of labour (the main economic indicator linked to competitiveness, and thus, the focus of the analysis in this section), the factors which contribute to its possible growth are:

- (i) improvement in the quality of the labour input (estimated by the composition of workers by education levels);
- (ii) increased stock of capital (within which there is now a tendency to distinguish between ICT capital and other physical capital);
- (iii) total factor productivity (TFP).

This last component is calculated as a residual factor of what the other aspects are unable to explain and, since Solow, it has been considered the traditional method of measuring innovation by economists.

Thus, from the data collected in Table 1, it is possible to conclude that apparent productivity of labour (the result of dividing GDP by the number of hours worked) had much higher growth in the Basque Country than in the Spanish economy (an economy which is characterised by growth in low-added-value activities), but lower than what occurred in advanced economies such as Germany and the United

States. With the arrival of the crisis, downsizing made passive increases in the apparent productivity of labour possible, especially in Spain. And in Spain, the recovery from the crisis has been characterised by a return to the growth model of low-added-value activities which, in the most recent period, appears to have extended to more countries, according to the OECD (2019). In this context, the growth in apparent productivity of labour in the Basque Country is noteworthy, even more so being accompanied by significant job creation.

Productivity growth in the Basque Country is significant and parallel to job growth

TABLE 1 Contribution of different factors to the growth of apparent productivity of labour (annual rates)

		2001-2007	2008-2012	2013-2018
Labour productivity growth (%)	Basque Country	1.16	1.56	1.13
	Spain	0.43	1.70	0.59
	Germany	1.51	0.54	0.78
	USA	2.52	1.67	0.80
Contribution of labour quality (%)	Basque Country	0.33	0.21	0.16
	Spain	0.30	0.46	0.18
	Germany	0.15	0.35	0.00
	USA	0.24	0.26	0.27
Total contribution of capital (%)	Basque Country	0.42	1.92	0.78
	Spain	1.00	2.34	0.30
	Germany	1.00	0.73	0.41
	USA	1.47	1.35	0.61
Contribution of ICT capital (%)	Basque Country	0.22	0.30	0.56
	Spain	0.38	0.41	0.30
	Germany	0.37	0.25	0.21
	USA	0.58	0.54	0.41
Contribution of non-ICT capital (%)	Basque Country	0.20	1.62	0.22
	Spain	0.62	1.93	0.00
	Germany	0.63	0.47	0.20
	USA	0.89	0.81	0.20
Contribution of TFP (%)	Basque Country	0.42	-0.57	0.21
	Spain	-0.87	-1.08	0.11
	Germany	0.38	-0.55	0.36
	USA	0.83	0.07	-0.07

Source: Compiled by authors based on data from Eustat (Basque Statistics Office) and The Conference Board and Alberdi (2015).

To the extent that in all countries there is an increase in the educational levels of their workers, this factor contributes positively to productivity growth. However, this contribution is smaller than that of other factors, and one might think that, as is already reflected in data for the Basque Country, this contribution will grow smaller (see the trend analysis in Subsection 4.2).

The contribution of improvements in worker education levels to productivity growth is declining

The increase in productivity depends on an increased contribution of ICT capital

From Table 1 it is possible to conclude that the main factor which explains growth in the apparent productivity of labour is physical capital. Within this, increasingly more importance is being placed on ICT capital. Despite the fact that, to a fairly wide extent, the contribution of non-ICT capital is greater than that of ICT capital, it is important to remember that this is due to the fact that the stock of ICT capital is still small in relation to the total stock of capital (ICT and non-ICT). Analysts used to adduce that the more innovative economies, such as the United States, were particularly characterised by the high contribution of ICT capital to productivity growth. By contrast, in economies such as Spain, the basis of productivity growth lay in non-ICT capital. In this regard, the large contribution to the growth of apparent productivity of labour deriving from ICT capital in the Basque Country during the current period (2013–2018) is highly positive.

Lastly, following the overall decline in TFP during the period of the crisis (2008–2012), in the recent period there has been a recovery, also widespread. Nonetheless, two exceptions must be made. One, that TFP growth is at lower levels than those attained during the 2001–2007 period, and they are even lower still if we compare them with those from the last century. As TCB (2019) and the OECD (2019) warn, mature economies are facing low growth in productivity and standards of living. However, two, within this weak recovery, we can identify differences in performance. In economies like the United States there is acute concern about their poor performance in TFP (even reaching negative values in recent years). In contrast to this, although it has lower values than those achieved in the years preceding the crisis, the Basque Country's position is comparatively positive.

In conclusion, it is therefore notable that, although in the Basque Country the contribution made by improvement in the labour input to growth in apparent productivity of labour has been relatively small, the contribution made by physical capital largely lies with ICT capital. Taking into account that this is an indicator which measures the degree of progress on innovation, the Basque Country ranks positively in comparison with other economies.

3.2 Occupation analysis

The aim of this subsection is to analyse the impact of the four major trends mentioned earlier on employment in the Basque Country, and therefore, on the skills which individuals will need to develop.

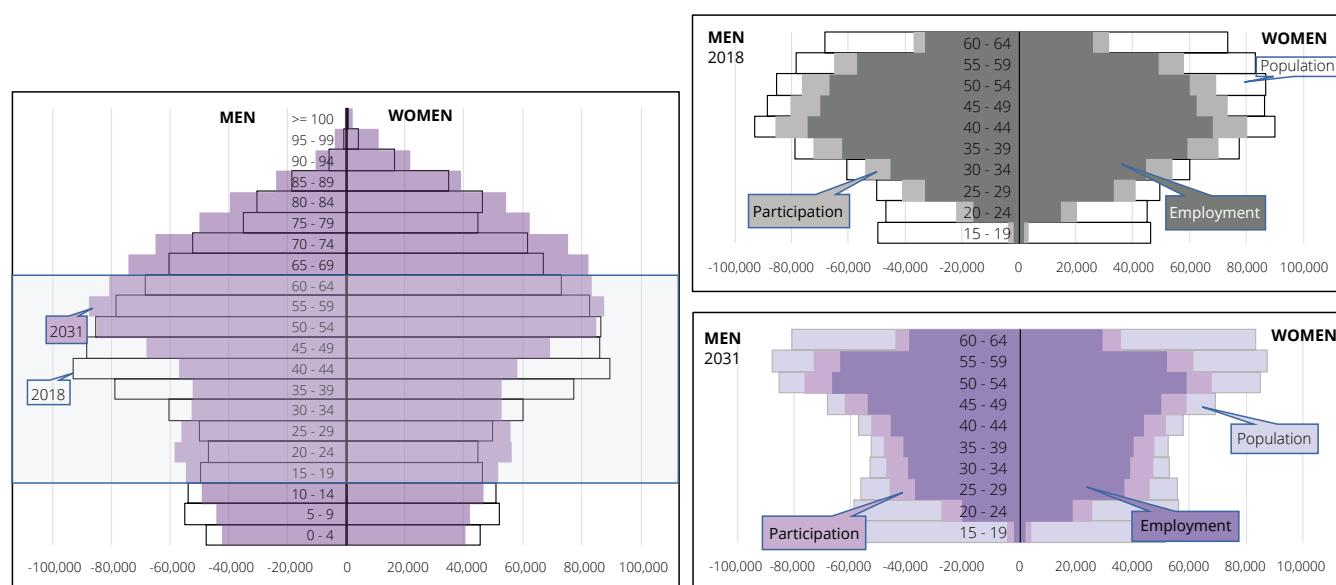
3.2.1 Ageing

As regards to the impact of demographic change, like the rest of Europe and the majority of developed countries, Eustat (Basque Statistics Office) projections to 2031 show an increasingly long-lived population, within which the working-age population (potentially active population) is declining. Additionally, as part of this, the population is becoming more concentrated in the older age bands. Thus, it is expected that the population aged 15 to 64 will fall from 1.39 million in 2018 (64% of the population) to 1.31 million in 2031 (60%). The latter percentage is similar to that which Eurostat projects for Germany, and a little more pronounced than that of Spain as a whole and the EU-28 average (both at 61%). As we can see on the left side of Graph 3, in 2031 the population over the age of 55 begins to be more nu-

merous than it is in 2018. This means that the population aged 55–64 will go from representing 22% of the working-age population to 26% in 2031. This percentage is close to that estimated for Spain (25%), but is higher than the figures for Germany and the EU-28 average (22%). Additionally, the population of the Basque cohorts between the ages of 15 and 29 will be higher than the current population in those age bands, going from 21% to 26% of the working-age population (higher than the 24% for Germany and lower than the 27% for Spain and the EU-28). Nevertheless, the narrowing of the population pyramid means that the youth population coming in to form part of the potentially active population will be smaller than that found in the retirement age bands.

The working population declines and is concentrated in the higher age segments

GRAPH 3 Population pyramid, participation and employment (2018 and 2031)



Source: Eustat (Basque Statistics Office). Population projections. Compiled by authors.

Graph 3 shows the result of applying the participation and employment rates for 2016 to 2018 and 2031. These vary by sex (lower for women than for men) and age (higher in the middle age bands than in the higher and lower ones). In this scenario, the economically active population would fall from 1.04 million to 927,000 (from 47.7 % to 42.4% of the total population of the Basque Country) and the working population would go from 879,000 to 780,000 (40.3% and 35.7% of the population). Successfully increasing these percentages will depend on boosting both the labour force participation rate (more people entering the job market) and the rate of those who obtain employment. The greatest potential lies in both the youngest members of the population and the oldest. In the case of the youngest, it is a matter of reducing youth unemployment rates, but also of increasing the labour force participation rate. This can be achieved by fostering dual education which makes it possible to combine employment and training. Ensuring that labour force participation and employment rates for the upper cohorts are higher in ten to fifteen years entails not neglecting the training and education of those who are currently in the middle age cohorts, between the ages of 35 and 50. It is also important to bear in mind the potential of creating female employment, as women start from lower employment rates than do men. It is therefore important to take these profiles and the different education and train-

ing needs in terms of gender and age into account when considering training and education pathways.

3.2.2 Automation

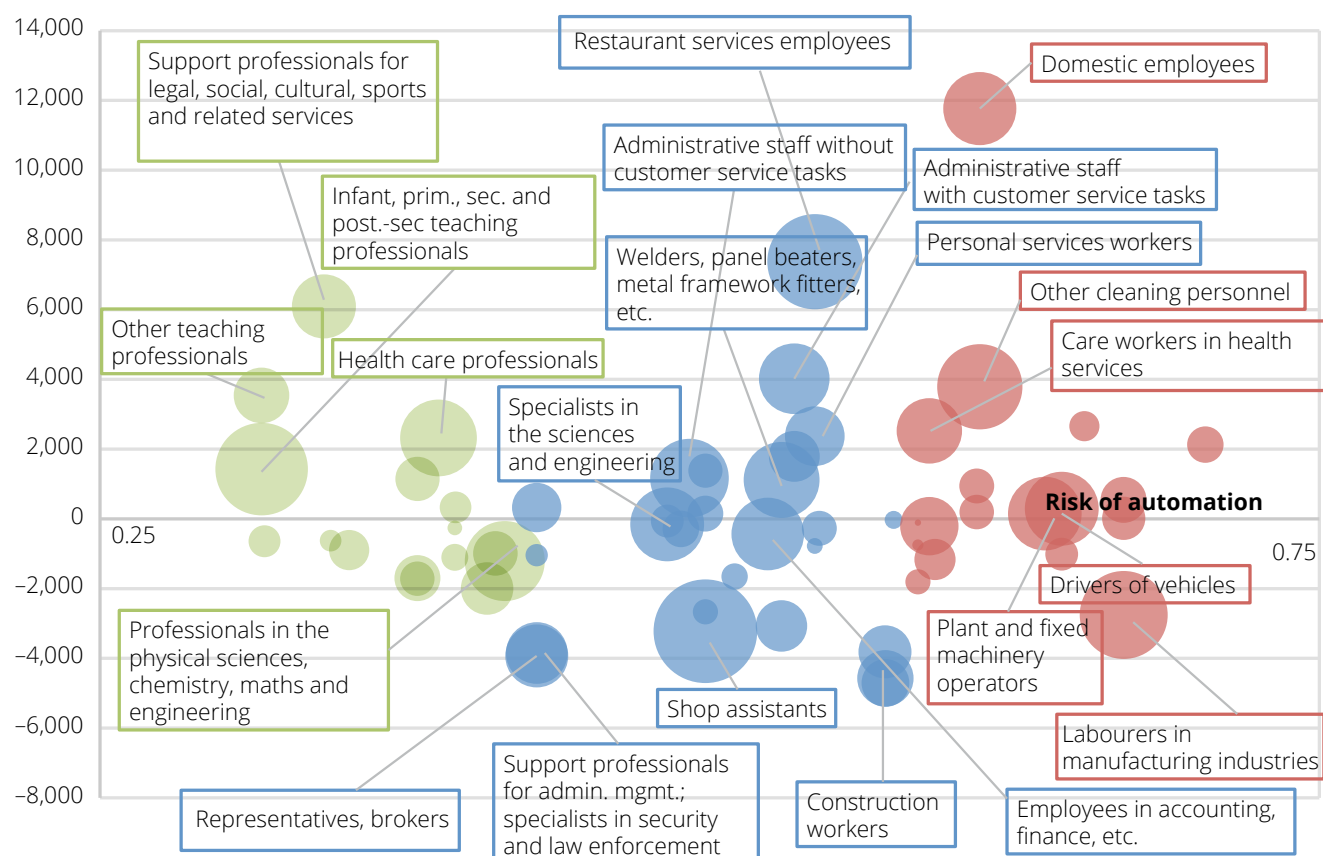
In the case of the impact of new technologies, in recent years there have been a number of analyses to calculate the risk of automation for jobs. The different assumptions utilised lead to different estimations of job vulnerability. However, three considerations must be made in this regard. Firstly, that although many analysts make reference to the possible negative impact of automation on the total quantity of jobs, they do not highlight in the same manner the contribution which automation may make to tackling the challenge of ageing discussed above, as automation processes may help to offset the need to fill existing jobs (OECD, 2018; CES, 2018). Secondly, automation is influencing not only the amount of work (the aspect analysed here), but also its quality (the aspect mentioned in Section 2, for which some indicators are included in the Analytical Report): stability, pay inequality, etc. (OECD, 2019). Thirdly, we must not fall prey to 'technological determinism' or thinking that 'risks' are equivalent to 'losses' of employment or an inevitable deterioration of job quality. The different impacts observed from one place to another highlight the fact that there is ample room for policies (education and training activities, fiscal measures such as taxes on the use of robots, labour market reform, industrial policies, etc.) (OECD, 2019).

In response to technological determinism, it is important to note the broad scope for education, fiscal, labour and industrial policies, among others

Among the most recent studies is one conducted by the OECD (2018), which has the particular feature of using not national but regional estimates. This paper calculates the risk of automation for occupations taking into account that differences in how work is organised result in a given occupation incorporating different tasks in different countries. Thus, for example, people who work on production lines in some countries perform merely manual tasks, which are easier to automate than in countries where operators with the same occupation monitor robots or perform quality control measures. The risk of automation calculated for the Basque Country is 21.5% of jobs in 2016, which puts this autonomous community in position 141 out of 178 European regions in the ranking of lowest to highest risk of automation (that is, more affected by the risk of automation than the majority of European regions considered). Nevertheless, in comparison with the other Spanish autonomous communities, the OECD report ranks the Basque Country third. The assessment regarding Spanish regions given by the OECD coincides with what can be concluded from a study by Doménech *et al.* (2018), which indicates that the average probability of automation for occupations in the Basque Country for the 2011–2016 period was the second lowest, after Madrid.

Risk of automation is higher in the Basque Country than in the majority of EU regions

Shifting from the aggregate level to looking at the risk of automation by occupation, Graph 4 shows how employment is distributed by occupation (bubble size), risk of automation (horizontal axis) and job creation/loss for the 2011–2016 period in the Basque Country (vertical axis), applying the risk factor for each occupation from the OECD study. The occupations with the lowest risk of automation are located on the left side of the graph (in green) and generally represent occupations with higher skill levels. On the other side of the graph are the occupations with the highest risk of automation (in red), which generally have lower skill levels.

GRAPH 4 Occupations by risk of automation and job creation or loss, 2011–2016

Source: Eustat (Basque Statistics Office), Population and Housing Statistics (2016) and Population and Housing Census (2011); and OECD (2018). Compiled by authors.

Although in the past, the jobs negatively affected by technological change were primarily those which were lower skilled, starting early in this century, the literature began to point out that this is changing and that it is the occupations with mid-level skills that are experiencing the greatest negative impact. We can thus detect a polarisation taking place: growing demand for, one, jobs in specialised, highly skilled professional and technical occupations (still difficult to automate, as development of artificial intelligence is still limited); and two, non-routine low-skilled jobs that require the worker's physical presence (OECD, 2011, 2018 and 2019; CES, 2018). That is to say, both high- and low-skilled jobs are growing proportionally, while those requiring mid-level skills are decreasing, which is why there is talk of 'polarisation'. But to this term authors such as Green (2016) add the qualification 'asymmetrical', as high-skilled jobs are growing quite a bit more than low-skilled ones, given that those of a routine nature in the latter group are also negatively affected.

The aggregate effect is shown in Table 2. As we can see, approximately half of the jobs in the Basque Country are medium risk. Women are employed in low-risk activities to a greater extent than men. This is primarily due to the greater presence of women in education and health care professions. In the 2011–2016 period there was a slight increase in employment, especially in high-risk occupations, which grew 7.1%. This increase in positions with a greater risk of automation also primarily occurred in female employment, as although this rose in all

Women are employed in activities with a low risk of automation in a greater proportion than men, although there is an increase in women being employed in positions with greater risk

risk bands, growth was mainly in the high-risk band. The decline in medium-risk jobs occurred for men to a greater extent, due to their greater presence among construction workers.

TABLE 2 Distribution of occupations by risk and sex, 2011–2016

	Employment in 2016 (%)			Change 2011–2016 (%)		
	Total	Men	Women	Total	Men	Women
Low	24%	21%	28%	1.7%	0.2%	3.0%
Medium	47%	49%	45%	–3.4%	–6.1%	0.1%
High	29%	30%	27%	7.1%	3.8%	11.4%

Source: Eustat (Basque Statistics Office). Population and Housing Statistics (2016) and Population and Housing Census (2011). Compiled by authors.

We must increase the sophistication of occupations with a greater risk of automation and foster transitions to lower-risk occupations

Successfully reducing the risk of job losses due to automation involves, firstly, increasing the sophistication of tasks in medium- and high-risk occupations and generating the individual capabilities to carry out these more sophisticated tasks. Secondly, it is also necessary to define professional and training pathways that will help people transition from higher-risk occupations to those with a lower risk of automation. In any event, policies should be implemented to offset losses due to automation, preferably active in nature (personalised training and guidance) rather than passive (unemployment benefits). And on the part of business, as the WEF report (2019) asserts, it is key for firms to engage in strategic workforce planning, both internally and with supporting stakeholders such as cluster associations.

3.2.3 Globalisation

The impact of the third trend, globalisation, can be approached from the perspective of the flow of persons entering and leaving a territory, that is, the migration flows which are equally a part of demographic trends.

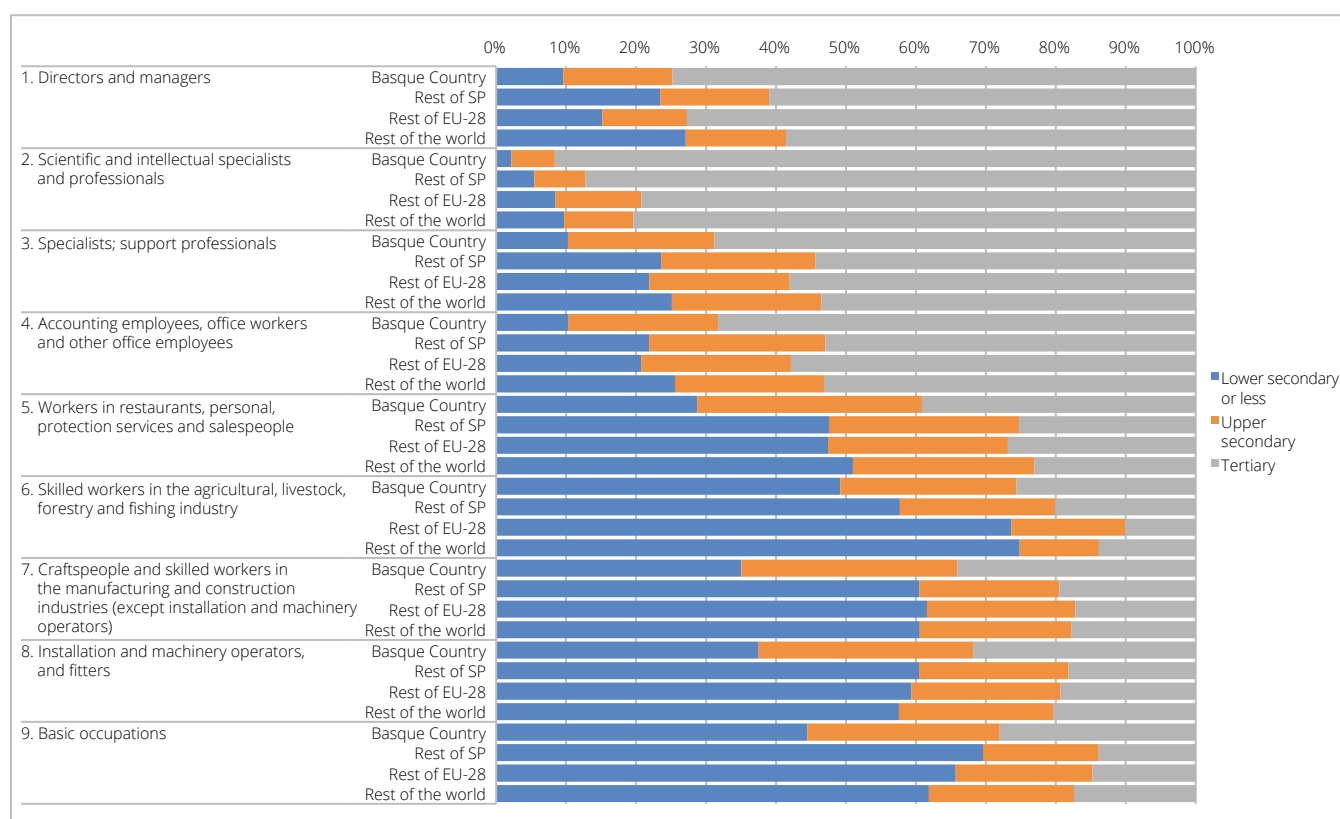
The pressures deriving from demographic change can be somewhat alleviated by attracting people. Given that the analytical report looks at the development of these migration flows, here we will focus on education level and the occupations held by people according to their place of birth. This partially reflects the Basque Country's attractiveness and the different training and education needs which may be required. In Table 3 we can see that approximately 20% of people in work who reside in the Basque Country were born elsewhere: 12% in other Spanish autonomous communities, 2% in the rest of the EU-28 and 7% in the rest of the world. The population born outside the territory is employed in low-skilled occupations to a greater extent than those born in the Basque Country. The difference is greater in the case of people born abroad, but it is also seen in those born in other Spanish autonomous communities. And it is particularly marked among people from outside the EU-28, who have a larger presence among basic occupations, skilled workers in the primary sector (although this occupation accounts for a minimal share) and workers in hospitality, personal, protection and sales services.

Foreign-born population are employed to a large extent in professions with low qualification

TABLE 3 People in work in the Basque Country by occupation and place of birth, 2016

	Number of people in work (thousands)				Percentage of total for occupation group				Percentage of total in work, born locally			
	Basque Country	Rest of Sp	Rest of the EU-28	Rest of the world	Basque Country	Rest of Sp	Rest of the EU-28	Rest of the world	Basque Country	Rest of Sp	Rest of the EU-28	Rest of the world
1. Directors and managers	17.2	2.5	0.3	0.4	84%	12%	1%	2%	2%	2%	1%	1%
2. Scientific and intellectual specialists and professionals	144.7	17.2	2.7	3.6	86%	10%	2%	2%	20%	16%	15%	6%
3. Specialists; support professionals	96.7	11.3	1.3	2.3	87%	10%	1%	2%	14%	10%	7%	4%
4. Accounting employees, office workers and other office employees	87.4	10.7	1.0	2.0	86%	11%	1%	2%	12%	10%	5%	3%
5. Workers in restaurants, personal, protection services and salespeople	140.9	24.1	3.2	17.9	76%	13%	2%	10%	20%	22%	17%	28%
6. Skilled workers in the agricultural, livestock, forestry and fishing industry	4.2	0.6	0.2	0.6	74%	11%	4%	11%	1%	1%	1%	1%
7. Craftspeople and skilled workers in the manufacturing and construction industries (except installation and machinery operators)	76.8	14.5	3.0	5.6	77%	15%	3%	6%	11%	13%	16%	9%
8. Installation and machinery operators, and fitters	55.2	9.5	1.4	2.9	80%	14%	2%	4%	8%	9%	7%	5%
9. Basic occupations	91.2	20.1	5.3	27.6	63%	14%	4%	19%	13%	18%	29%	44%
TOTAL	714.1	110.6	18.4	63.0	79%	12%	2%	7%	100%	100%	100%	100%

Source: Eustat (Basque Statistics Office). Population and Housing Statistics. Compiled by authors.

GRAPH 5 People in work by occupation, education level and place of birth, 2016

Source: Eustat (Basque Statistics Office). Population and Housing Statistics. Compiled by authors.

This is supplemented by a more detailed look at the education level of people in each occupation according to their place of birth, which can be seen in Graph 5. In this regard it is possible to note that, in all occupations, people born in the Basque Country have a higher education level than those born elsewhere. This translates into a higher degree of mismatch in the least-skilled occupations, which poses certain considerations around attracting people in the future and the training and education needs of those currently in the territory:

- In the future, it may be necessary to attract people with a higher education level in order to meet employment needs in more skilled occupations (see the boxes on Bizkaia Talent and Ikerbasque). However, if – as indicated in another part of the report – there were a significant overqualification problem in the Basque Country, that policy of attracting talent would need to be very specific and deal with areas in which, as the literature has highlighted, not only educational level, but also internationalisation and diversity of approaches, represent a plus. This has been pointed out, for example, in the Competitiveness Report for 2011, in relation to the management teams of firms, teaching staff at universities, researchers at technology centres, etc.
- Through suitable processes, people with more training and education in the least-skilled occupations can have easier access to more highly skilled occupations, and also to performing more complex tasks in the occupations they hold, thus reducing the risk that those occupations will be fully automated. In other words, incorporating new technologies into lower-skilled occupations can help

Current overqualification levels require a policy for attracting talent centred on covering specific inadequacies

reduce the purely routine processes in these. However, this should not produce job losses if the people who currently perform these tasks (and those who do so in the future) have the necessary capabilities to make use of those technologies.

- People from elsewhere may require different training and education processes which enable them to adapt their qualifications (degrees/diplomas) and capabilities to those required by the productive fabric.
- Additionally, and although the breakdown by sex is not included in the graph, it is important to note that, except for the basic occupations, and regardless of place of birth, women have a higher education level than men. This may be due to a larger female presence in sectors with higher educational requirements in the most-skilled professions. However, it may also be part of a bias, in which only better-qualified women are able to access positions held by men with lower skills.

Foreign-born population require specific training and education to adapt their qualifications and skills to the productive fabric

BOX 1 Attracting talent with a university background through Bizkaia Talent

Backed by the Economic Development Department of the Provincial Council of Bizkaia, Bizkaia Talent was established in 2005 as a not-for-profit association initiative with the mission of driving and fostering the establishment of the necessary conditions in Bilbao, in Bizkaia and in the Basque Country, to attract, connect and retain highly skilled people. The initiative has now expanded into the three historical territories. The Gipuzkoa Talent initiative, for example, is managed by Bizkaia Talent and stands as an example of policy coordination within the autonomous community.

The profile of highly skilled people on which the policy of Bizkaia Talent is focused relates to people with university qualifications. Its goal of attracting and retaining such people has given rise to the development of several lines of action: from attracting talent through international networks (Be Basque Talent Network and Basque Talent Map) – which include sociocultural integration services for the professionals, and support for professional career development (Talentia, Career Development Center, and Kids and Skills) – to the services offered to firms for preparation of job postings and attracting professionals who support the firm's value proposition (Headhunting Support Service).

At Bizkaia Talent, online platforms and tools represent one of the core strengths for carrying out the work. They are the result of an organisational culture characterised by its participatory and innovative nature. Another of the aspects which make Bizkaia Talent's activity unique lies in the personalised service it offers, for those both seeking and offering talent. Collaboration with a diverse range of public-private stakeholders is the foundation that makes it possible to offer this personalisation.

In contrast, one of its main challenges lies in the need to generate a stronger business culture and awareness to facilitate attracting and retaining talent at the European level. Patterns in labour relations, along with the size of the firm, are considered core determining factors in this regard. Likewise, another path towards development in this sphere involves people with lower-skilled backgrounds, which would require adapting the policy for attracting talent.

BOX 2 Attracting talent with a scientific background through Ikerbasque

It has been a little over a decade since the Basque Government took the decision to establish the Ikerbasque Foundation to give a renewed boost to scientific research in the Basque Country. This is a commitment to investment in scientific talent, in research staff. It came out of the conviction that this investment in human capital was the key component that would trigger a multiplier effect in Basque science.

Throughout these years, including the most difficult period of the crisis, the Ikerbasque Foundation has consistently issued vacancy announcements to attract and recruit scientific talent. The foundation currently has over 240 researchers assigned to 23 institutions in the Basque Country. This group is comprised of both leading international scientific researchers and promising young talents in their field of research. Each year, the group publishes over 1,100 scientific articles. In this decade, research projects in the Basque Country have produced a financial return of 175 million euros. This is a return of 2 euros for every 1 euro invested in Ikerbasque. This success has been based on three key elements:

- Independent management: Following the European model of the European Research Council, this independence has made it possible to transfer a model of excellence in both management of the organisation and in the recruitment and hiring of researchers, managed exclusively based on criteria of scientific excellence.
- Solidity: Ikerbasque has succeeded in seamlessly maintaining and improving its programmes and its commitments to the scientific community over time, conveying its commitment to people as the core element of the development of science.
- Networked collaboration: Ikerbasque engages in its activity in close partnership with 23 universities and research centres in the Basque Country. This is difficult to replicate in other environments at the national or European level due to the simple effects of scale.

In attracting this scientific talent, Ikerbasque has worked closely with Bizkaia Talent, for which this was one of its aims since its creation.

3.2.4 *Climate change*

The current scientific consensus (IPCC, 2018) is that global warming due to human activity has a high probability of reaching 1.5 °C at some point between 2030 and 2052, if current trends continue. This increase in the average temperature of the planet's surface will give rise to an upturn in the intensity and frequency of extreme weather and meteorological events, which will have a significant impact on the economy and on human and natural systems.

According to the IPCC (2018), adopting mitigation measures for greenhouse gas emissions consisting of a 1.5 °C increase will generate synergies in areas related to the UN Sustainable Development Goals, including health, clean energy, cities and communities, responsible production and consumption, and the oceans. It will also generate risks in other areas such as poverty, hunger, and access to and availability of water and energy. In general, the total impact of climate change will depend on the type and scope of adaptation measures and their pace of implementation, among other factors.

The risks deriving from climate change involve the need to adapt energy systems to transform them into sustainable systems from an economic, energy/environmental and social perspective. This process of change, known as energy transition, entails taking action along the entire energy value chain (extraction and production, transmission, transformation, distribution and consumption), with a view to reducing greenhouse gas emissions and boosting energy efficiency (i.e., consuming less energy and using the energy produced in a better manner). This adaptation of the energy system will give rise to opportunities for creating value and wealth, and to costs which will be distributed unequally among the different sectors of the economy.

Energy transition is also an opportunity in terms of job creation and GDP

The opportunities which will be generated by the energy transition in the Basque Country, in terms of job creation and GDP, will be mainly linked to industries such as energy or mobility and transport.

In particular, growth and development opportunities will emerge in the historically best-positioned value chains in the Basque Country (e.g., power grids; power electronics; renewable energies, especially solar power and wind power – land and sea, fixed and floating – auto components, etc.) and in those with significant growth potential (e.g., electrical energy storage). Other value chains that make a significant contribution to the GDP of the Basque Country, such as the oil and natural gas industry, may also be able to exploit opportunity niches throughout the energy transition process. Lastly, the energy efficiency industry in the broad sense of the term (e.g., replacing building equipment and improving energy consumption processes in industry), including what is known as the ‘circular economy’, could also generate opportunities in the Basque Country.

In the mobility and transport industry, a field now undergoing profound changes and which is expected to undertake highly significant implementation of electric mobility over the next two decades, the Basque Country is well positioned to adapt the activities carried out in the automotive and railway construction industries. Highlights include a strong position in manufacturing and integration of vehicle components, and the manufacture of trains in response to new demand for electric mobility.

In both energy and mobility, the Basque Country is particularly well positioned to develop products and services which incorporate advanced sensing and control devices and other developments (e.g., applications to control, monitor and operate installations and/or assets) into existing products. The intersection between digitisation, processing and data analysis and the traditional energy industry may be a source of opportunities for job creation.

The exploitation of all of these possibilities to which the energy transition will give rise will largely depend on the capacity to continue innovating and developing and adapting both physical capital (energy, transport and research infrastructures) and human capital. In the medium and long term, there is concern about the progress of development of the skills required: not only due to the training and education supply in these areas (which is gradually adapting), but also due to the perception that there is limited interest in training in key technical disciplines to take advantage of the opportunities of the energy transition. These include electrical engineering, computer engineering and telecommunications engineer-

Increase interest in training in key technical disciplines is of greater concern than adapting the training and education on offer

ing; mathematics, statistics and data analysis; advanced programming; and materials physics and chemistry.¹⁰

3.3 Employment trends and their conversion into training and education needs

The aim of this subsection is to consider the degree of match between the supply of graduates from VET and universities and the employment possibilities expected in the future. In order to do so, we begin by presenting the opportunities estimated using the Futurelan model developed by the Economic Forecasting Centre (Ceprede) for Lanbide. Secondly, these forecasts for employment opportunities are converted into the holders of VET and university qualifications required, and then compared to the figures of those currently obtaining these qualifications. In this way, we determine whether the current supply matches the predicted needs of the future.

3.3.1 Sector-specific employment forecasts and employment opportunities

Table 4 presents the real (2007 and 2013) and estimated (2018 and 2030) variation in sector-specific employment in the Basque Country, produced by Ceprede. In order to provide a comparative perspective, in addition to the distribution and change in employment by major sector in the Basque Country (prepared by Ceprede), Table 5 presents the figures for Spain (those provided by both Ceprede and Eurostat/Cedefop) and the EU-28 (provided by Eurostat/Cedefop). Having two estimates for Spain, one produced by using a methodology similar to that utilised for the Basque Country and another with a totally different methodology, makes it possible to firstly, recognise the degree of deviation which can be found in this type of estimates, and secondly, better evaluate the comparability of the data for the Basque Country with those provided by Cedefop.

¹⁰ Source: forthcoming Orchestra paper on the opportunities of the energy transition in the Basque economy.

TABLE 4 Sector-specific employment, real and estimated, for the Basque Country, according to Futurelan

	Number				% of total				Percentage of change		
	2007	2013	2018	2030	2007	2013	2018	2030	2007-13	2013-18	2018-30
Agriculture, livestock and fishing	14,655	12,687	11,566	6,149	1.5	1.4	1.2	0.6	-13.4	-8.8	-46.8
Extractive Industries	822	468	399	380	0.1	0.1	0.0	0.0	-43.1	-14.8	-4.6
Food and beverages	16,083	14,375	14,426	13,010	1.6	1.6	1.5	1.3	-10.6	0.4	-9.8
Textiles, apparel, leather and footwear	3,890	2,419	2,067	1,451	0.4	0.3	0.2	0.1	-37.8	-14.6	-29.8
Wood, paper and printing	17,960	11,899	11,091	10,022	1.8	1.4	1.2	1.0	-33.7	-6.8	-9.6
Manufacture of coke and refined petroleum products	859	970	800	301	0.1	0.1	0.1	0.0	12.9	-17.5	-62.4
Chemicals and pharmaceuticals	6,166	4,596	4,866	4,556	0.6	0.5	0.5	0.4	-25.5	5.9	-6.4
Rubber, plastics and other non-metals	26,516	18,694	18,241	15,360	2.7	2.1	1.9	1.5	-29.5	-2.4	-15.8
Metallurgy and metal products	94,402	66,136	67,939	52,955	9.5	7.5	7.2	5.2	-29.9	2.7	-22.1
Computer and electronic products	6,558	5,941	6,568	5,859	0.7	0.7	0.7	0.6	-9.4	10.5	-10.8
Electrical materials and equipment	14,534	10,273	9,037	8,062	1.5	1.2	1.0	0.8	-29.3	-12.0	-10.8
Machinery and equipment	23,591	20,078	22,341	20,697	2.4	2.3	2.4	2.0	-14.9	11.3	-7.4
Transport equipment	17,506	16,558	18,654	18,003	1.8	1.9	2.0	1.8	-5.4	12.7	-3.5
Furniture and other manufactured goods	17,615	12,721	14,096	12,597	1.8	1.4	1.5	1.2	-27.8	10.8	-10.6
Electricity, gas and steam	2,335	2,276	2,138	2,039	0.2	0.3	0.2	0.2	-2.5	-6.1	-4.6
Water supply and treatment	5,373	5,666	5,830	5,562	0.5	0.6	0.6	0.5	5.5	2.9	-4.6
Construction	100,582	56,716	57,759	56,539	10.1	6.5	6.1	5.5	-43.6	1.8	-2.1
Commerce; vehicle repair	139,247	124,741	131,256	147,051	14.0	14.2	14.0	14.4	-10.4	5.2	12.0
Transport and storage	46,098	39,756	45,593	63,619	4.6	4.5	4.9	6.2	-13.8	14.7	39.5
Hospitality	48,403	50,407	57,265	67,212	4.9	5.7	6.1	6.6	4.1	13.6	17.4
Editing, video, radio and television	7,146	5,547	5,572	6,706	0.7	0.6	0.6	0.7	-22.4	0.4	20.4
Telecommunications	3,052	2,717	2,291	2,757	0.3	0.3	0.2	0.3	-11.0	-15.7	20.4
Information technology	13,469	12,098	13,384	16,110	1.4	1.4	1.4	1.6	-10.2	10.6	20.4
Financial activities and insurance	20,981	18,227	17,414	23,542	2.1	2.1	1.9	2.3	-13.1	-4.5	35.2
Real estate activities	6,820	5,281	5,507	7,369	0.7	0.6	0.6	0.7	-22.6	4.3	33.8
Consultancy and technical activities	38,531	38,896	42,954	51,703	3.9	4.4	4.6	5.1	0.9	10.4	20.4
Research and development	5,097	6,762	7,603	9,152	0.5	0.8	0.8	0.9	32.7	12.4	20.4
Other professional activities	11,259	10,400	12,191	14,674	1.1	1.2	1.3	1.4	-7.6	17.2	20.4
Auxiliary services	57,982	54,232	61,307	73,793	5.8	6.2	6.5	7.2	-6.5	13.0	20.4
Public administration and defence	53,193	56,179	57,152	62,159	5.3	6.4	6.1	6.1	5.6	1.7	8.8
Education	55,795	62,736	68,916	74,953	5.6	7.1	7.3	7.4	12.4	9.9	8.8
Health care activities	39,546	42,999	47,466	51,625	4.0	4.9	5.0	5.1	8.7	10.4	8.8
Social services activities	22,646	23,507	26,649	28,983	2.3	2.7	2.8	2.8	3.8	13.4	8.8
Recreational and cultural activities	11,446	12,332	13,902	16,733	1.1	1.4	1.5	1.6	7.7	12.7	20.4
Other services	21,833	21,667	23,935	28,810	2.2	2.5	2.5	2.8	-0.8	10.5	20.4
Household activities	24,280	28,143	31,801	38,278	2.4	3.2	3.4	3.8	15.9	13.0	20.4
Total sectors	996,271	879,100	939,975	1,018,771	100.0	100.0	100.0	100.0	-11.8	6.9	8.4
Agriculture, livestock and fishing	14,655	12,687	11,566	6,149	1.5	1.4	1.2	0.6	-13.4	-8.8	-46.8
Manufacturing	245,680	184,660	190,126	162,873	24.7	21.0	20.2	16.0	-24.8	3.0	-14.3
Extractives and energy	8,530	8,410	8,367	7,981	0.9	1.0	0.9	0.8	-1.4	-0.5	-4.6
Construction	100,582	56,716	57,759	56,539	10.1	6.5	6.1	5.5	-43.6	1.8	-2.1
Distribution, transport and hospitality	233,748	214,904	234,114	277,881	23.5	24.4	24.9	27.3	-8.1	8.9	18.7
Business services	221,896	216,302	237,860	289,627	22.3	24.6	25.3	28.4	-2.5	10.0	21.8
Non-commercial services	171,180	185,421	200,183	217,720	17.2	21.1	21.3	21.4	8.3	8.0	8.8

Source: Lanbide, Futurelan.

Thus, for example, whereas Ceprede predicts that between 2018 and 2030, Spanish manufacturing jobs will remain virtually at a standstill (growing 0.3%), Cedefop predicts quite significant growth (11.5%) for that period. In contrast, whereas Ceprede calculates strong job growth in business services and non-commercial services for Spain (21% and 18%, respectively), Cedefop offers much more modest forecasts (14% and

–5%, respectively). Insofar as the predictive model used by Ceprede for the Basque Country is based on that prepared by that institution for Spain as a whole, it might be expected that a model such as that used by Cedefop might offer less negative forecasts for the Basque Country as regards to its manufacturing jobs (which according to Ceprede, will drop 14%), and by contrast, less positive forecasts for business services and non-commercial services (which according to Ceprede, will increase by 22% and 8%, respectively, in the Basque Country). In any event, this is not the place to correct a predictive model which incorporates a broad range of data sources in a coherent and rigorous manner based on mere observations. And while no steps are taken for a possible reconsideration and adaptation of the only model currently in existence, our matching exercise will be based on the predictions provided by the same.

TABLE 5 Employment by major sectors, real and estimated, for the Basque Country, Spain and the EU-28

		% of total employment				Percentage rate of change			Cumulative annual rate of change		
		2007	2013	2018	2030	2007-13	2013-18	2018-30	2007-13	2013-18	2018-30
Basque Country (Ceprede/ Futurelan)	Agriculture, livestock and fishing	1.5	1.4	1.2	0.6	–13.4	–8.8	–46.8	–2.4	–1.8	–5.1
	Manufacturing	24.7	21.0	20.2	16.0	–24.8	3.0	–14.3	–4.6	0.6	–1.3
	Extractives and energy	0.9	1.0	0.9	0.8	–1.4	–0.5	–4.6	–0.2	–0.1	–0.4
	Construction	10.1	6.5	6.1	5.5	–43.6	1.8	–2.1	–9.1	0.4	–0.2
	Distribution, transport and hospitality	23.5	24.4	24.9	27.3	–8.1	8.9	18.7	–1.4	1.7	1.4
	Business services	22.3	24.6	25.3	28.4	–2.5	10.0	21.8	–0.4	1.9	1.7
	Non-commercial services	17.2	21.1	21.3	21.4	8.3	8.0	8.8	1.3	1.5	0.7
	Total sectors	100.0	100.0	100.0	100.0	–11.8	6.9	8.4	–2.1	1.3	0.7
Spain (Ceprede)	Agriculture, livestock and fishing	4.1	4.2	4.0	2.4	–14.8	7.4	–31.9	–2.6	1.4	–3.2
	Manufacturing	14.4	12.6	12.4	10.9	–28.2	11.4	0.3	–5.4	2.2	0.0
	Extractives and energy	0.8	0.8	0.7	0.8	–8.1	0.3	17.9	–1.4	0.1	1.4
	Construction	13.4	5.9	6.4	6.4	–64.0	23.0	13.9	–15.6	4.2	1.1
	Distribution, transport and hospitality	28.1	29.8	29.7	30.3	–13.4	13.3	15.8	–2.4	2.5	1.2
	Business services	21.2	24.2	24.9	26.5	–6.4	16.6	21.0	–1.1	3.1	1.6
	Non-commercial services	18.1	22.5	21.9	22.7	1.6	10.4	18.0	0.3	2.0	1.4
	Total sectors	100.0	100.0	100.0	100.0	–18.1	13.4	13.7	–3.3	2.5	1.1
Spain (Cedefop)	Agriculture, livestock and fishing	4.0	4.1	3.8	2.2	–14.6	4.8	–14.0	–2.6	0.9	–1.2
	Manufacturing	13.1	11.0	10.9	10.9	–29.4	10.9	11.5	–5.6	2.1	0.9
	Extractives and energy	1.1	1.3	1.2	1.2	–0.4	1.7	6.8	–0.1	0.3	0.6
	Construction	12.8	5.6	6.1	5.5	–63.1	20.8	13.2	–15.3	3.9	1.0
	Distribution, transport and hospitality	28.5	29.8	30.1	34.5	–12.2	12.8	24.2	–2.1	2.4	1.8
	Business services	23.0	26.3	26.4	28.2	–3.9	12.1	14.0	–0.7	2.3	1.1
	Non-commercial services	17.5	21.9	21.4	17.4	4.7	9.1	–4.8	0.8	1.8	–0.4
	Total sectors	100.0	100.0	100.0	100.0	–16.1	11.6	12.1	–2.9	2.2	1.0
EU-28 (Cedefop)	Agriculture, livestock and fishing	5.5	5.0	4.3	3.6	–10.8	–10.0	–10.4	–1.9	–2.1	–0.9
	Manufacturing	15.4	14.0	13.9	12.6	–11.2	5.6	–1.3	–2.0	1.1	–0.1
	Extractives and energy	1.6	1.6	1.5	1.5	0.7	–0.5	–1.1	0.1	–0.1	–0.1
	Construction	7.7	6.4	6.4	6.2	–17.7	5.9	4.4	–3.2	1.2	0.4
	Distribution, transport and hospitality	24.4	24.5	24.7	25.4	–1.3	7.4	6.9	–0.2	1.4	0.6
	Business services	23.1	24.8	25.7	27.8	4.9	10.6	12.9	0.8	2.0	1.0
	Non-commercial services	22.3	23.7	23.5	22.9	4.2	5.9	2.4	0.7	1.2	0.2
	Total sectors	100.0	100.0	100.0	100.0	–1.9	6.5	5.3	–0.3	1.3	0.4

Source: Lanbide, Futurelan; Eurostat, economic accounts; Ceprede; Cedefop, skills forecast.

When taking into account both Table 4 and Table 5, it is possible to conclude the following:

- Between 2007 and 2013, the Basque Country experienced job losses of 12%; between 2013 and 2018, employment recovered and grew 7%; and forecasts predict that from 2018 it will continue to grow at a somewhat slower pace (8.4% in total between 2018 and 2030), so that in 2030 there will be more than one million jobs in the Basque Country. In comparison with Spain, there were less job losses in the Basque Country between 2007 and 2013, but growth following this period has also been slower. And in comparison with the EU-28, between 2007 and 2013, job losses in the Basque Country were much greater; between 2013 and 2018, growth was quite similar; and growth estimates up to 2030 are more favourable for the Basque Country.
- By major sector, between 2007 and 2013, the largest job losses occurred – in all three territories, although with different levels of intensity – in the construction, manufacturing, and agriculture and fishing industries. During the 2013–2018 recovery, almost all of the major sectors saw an increase in employment (except agriculture and fishing), especially services. And estimates for 2018–2030 in all three territories anticipate that the agriculture and fishing industry will experience heavy job losses, and commercial services will see strong gains. However, estimates vary considerably from one territory to another in some major sectors. If we focus on manufacturing, for example, job losses of 14% are predicted for the Basque Country; for the EU-28, a slight drop of 1.3%; and for Spain, an increase of 0.3% according to Cefrede and 11.5% according to Cedefop. Balancing this out, in business services, the highest growth is predicted in the Basque Country (22%) and the lowest in the EU-28 (13%). Additionally, in construction and non-commercial services, the anticipated change is quite different from one territory to another.
- Regarding the sectoral structure of employment in 2030, it is worth mentioning that in the Basque Country, manufacturing will only account for 16%, a percentage clearly below the current 20%. Even so, this percentage is distinctly higher than the figures for that sector in the EU-28 (12.6%) and Spain (11%). The decline in Basque manufacturing jobs is balanced out by the rise in business services, a sector which will come to have the greatest weight in the Basque Country, with a percentage that exceeds both Spain and the EU-28. In general, the tertiarisation of employment is obvious in all three territories in 2030, and more than three quarters of jobs will belong to the services sector.
- If we move down a level in the industry breakdown and consider both the most extreme percentages of change and the relative size of the sector, noteworthy among manufacturing are the sharp declines expected in metallurgy and metal products, electrical materials and equipment, computer and electronic products, and rubber, plastics and other non-metals. By contrast, although they will also see a decline in employment, this decline will be less in transport equipment and in machinery and equipment. As regards to services, the highest growth is expected in transport and storage, and the lowest, in non-commercial services.

Futurelan predicts negative employment growth in agriculture and fishing and in manufacturing, and positive in services

The existing employment opportunities derive not only from net changes in employment (which can be termed ‘opportunities by expansion’), but also from the replacement needs resulting from existing employees leaving the activity (for reasons of retirement, disability, etc.). Table 6 presents the estimates for 2018–2030 produced by Futurelan in this regard.

TABLE 6 Employment opportunities in the Basque Country in the 2019–2030 period due to net change in employment and replacement

	Job				Percentages		
	Expansion of employment	Replacement	Total employment opportunities	Average annual employment opportunities	Of total employment opportunities	Replacement of employment 2018	Replacement of total employment opportunities
Agriculture, livestock and fishing	–5,417	2,136	–3,280	–273	–0.6	18.5	—
Manufacturing	–27,253	68,832	41,578	3,465	7.9	36.2	165.5
Extractives and energy	–385	3,464	3,079	257	0.6	41.4	112.5
Construction	–1,220	24,555	23,335	1,945	4.4	42.5	105.2
Distribution, transport and hospitality	43,768	111,782	155,550	12,962	29.5	47.7	71.9
Business services	51,767	121,428	173,195	14,433	32.8	51.1	70.1
Non-commercial services	17,537	116,637	134,174	11,181	25.4	58.3	86.9
Total sectors	78,796	448,834	527,630	43,969	100.0	47.7	85.1

Source: Lanbide, Futurelan

The most noteworthy data found in the table are the following:

50% of current employment in the Basque Country will be subject to replacement by 2030

- Almost 50% of jobs existing in 2018 in the Basque Country will require replacement in the 2018–2030 period. The rates estimated by Cedefop for Spain and the EU-28 are even higher: 54% and 52%, respectively.
- By major sector, non-commercial services will have a higher replacement rate (58%, compared to 48% for the sectors as a group). This is the result of the policy of limited replacement followed by the civil service, which has led to older staff at government bodies (as reflected by the 75.6% reported by the public administration and defence). In contrast, in manufacturing, this percentage is just 36%, possibly due to the fact that during the recent crisis, a good portion of the severe downsizing which took place in this sector was carried out by means of early retirement.¹¹ In business services there is also a higher job replacement rate than in the economy as a whole, with particularly high rates (over 60%) in the very knowledge-intensive branches: telecommunications, IT, and research and development.
- If replacement is related to total employment opportunities, the resulting percentages are even higher: replacement processes will account for more than 85% of total employment opportunities in the Basque Country in the 2018–2030 period. In Spain and the EU-28, the rates will also be close to this value: 81% in Spain and 91% in the EU-28. These differences between territories are related to the higher job creation rates estimated for Spain during that period, in comparison with the Basque Country, and for the latter, in comparison with the EU-28.

¹¹ Futurelan gives abnormally low replacement rates for the agriculture and fishing industry (18.5%), with regard to existing employment in 2018. Those provided by Cedefop for Spain (55.5%) and the EU-28 (68.5%) are a closer match with the image of an older population held for this industry.

- At a disaggregate level by sector, we can see that, although it is estimated that net change in employment in manufacturing and construction will be negative in the Basque Country, employment opportunities due to replacement will more than offset these losses. As a result, in these two sectors as well, total employment opportunities will be positive (41.6 and 23.3 thousand jobs, respectively), meaning that over 12% of total employment opportunities will come from these sectors. However, services will account for the bulk (88%) of employment opportunities.

3.3.2 *Need for holders of VET and university qualifications to meet employment opportunities*

To determine the need for holders of VET (mid-level and higher) and university qualifications, we began with the working population in different branches of activity in the Basque Country broken down by educational level, which is contained in the population and housing censuses and statistics from Eustat (Basque Statistics Office) for 2001, 2006, 2011 and 2016. This information was used to estimate the percentage of holders of VET and university qualifications in each branch of activity, as an average for the 2019–2030 period (see Table 7). Applying these percentages to total current employment opportunities, on average, for the 2019–2030 period, we get the total number of holders of VET and university qualifications that will be necessary to incorporate into those sectors (see the aforementioned table).

The implicit assumption in the estimation method employed is that the distribution by educational level found in each sector in 2016 (corrected for the evolving trend shown by this distribution from one census to another) will remain in place for the new employment opportunities generated between 2019 and 2030. However, it should be stated that if there is a mismatch in current employment due to overqualification, as the overqualification indicator indicates in the 2019 Diagnostic Analysis Report, the makeup and variation shown by the educational levels of the working population do not cover what is actually needed, but rather only the result of the ‘mismatched’ hires made. But with a view to this report, there are no distributions of ideal employment profiles by educational level at the sector level. Therefore, we have opted to exploit the existing data to see where they lead, being aware of their limitations and that the results must be taken with caution, more as generators of research questions than as unquestionable confirmation of proven facts.

Thus, based on the information about the average need for holders of VET and university qualifications by sector during the years of the 2019–2030 period, it is worth pointing out the following:

- For employment opportunities as a whole, the percentage of holders of university qualifications that will be required (40.6%), exceeds that of holders of intermediate and higher VET qualifications (24.9%). In the latter group, holders of higher qualifications will be more in demand than intermediate ones (14.5% compared to 10.4%).
- If we move down to analyse the sector level, in manufacturing and construction, the percentage of holders of VET qualifications will exceed that of holders of university qualifications by almost 15 percentual points. Within this difference,

In the Basque Country, replacement will have a greater impact in non-commercial services, and a lesser one in manufacturing

where the manufacturing industry values higher VET, in construction the two stages of VET have a fairly similar weight. In extractives and energy, as well as distribution, transport and hospitality, the demand for both types of qualification holders is quite similar (slightly higher for VET). And in business services, and especially non-commercial services (headed by education), holders of university qualifications account for a much greater share than those with VET.

TABLE 7 Holders of VET and university qualifications required for existing employment opportunities as an average for the years 2019–2030 in the Basque Country

	Employment opportunities	% of employment opportunities			No. of employment opportunities		
		MVET	HVET	University	MVET	HVET	University
Agriculture, livestock and fishing	–273	13.0	11.0	14.7	–36	–30	–40
Manufacturing	3,465	14.8	25.5	25.9	512	884	899
Extractives and energy	257	11.4	13.3	22.0	29	34	56
Construction	1,945	15.2	17.5	18.1	296	339	352
Distribution, transport and hospitality	12,962	12.8	15.9	27.0	1,656	2,067	3,498
Business services	14,433	8.5	12.4	40.9	1,221	1,792	5,897
Non-commercial services	11,181	7.7	10.6	64.8	858	1,184	7,244
Total sectors	43,969	10.4	14.5	40.6	4,585	6,366	17,857

Source: Compiled by authors based on Lanbide, Futurelan and Eustat population and housing censuses and statistics.

Manufacturing demands more holders of VET qualifications, and Services more university graduates

We will now move on to assessing the degree of horizontal (or field-of-study) (mis) match between current VET and university supply and the needs deriving from the employment opportunities identified earlier. The first is measured by the number of VET and university graduates by occupational category or subject area, for the last year for which data are available. And in order to estimate the second, we first need to distribute the holders of VET and university qualifications required to meet the employment opportunities among the occupational categories and subject areas. To do this, utilising the Lanbide work integration surveys, Orkestra has developed mapping tables which specify, of the percentage of holders of VET qualifications hired in each sector, what percentage corresponds to each occupational category; and of the holders of university qualifications hired, what percentage corresponds to each subject area.

From Table 7 it is possible to conclude that holders of VET qualifications in the 2017–2018 academic year exceed projected employment opportunities by a little over 3,000 people, on average, for the years 2019–2030. In other words, there will be overcoverage of close to 30%. However, it is necessary to take into account that a considerable portion of those who complete their VET studies do not actually enter the job market, for various reasons (among these, and significantly, because they decide to continue their studies). According to the Lanbide work integration survey, this is the case of 34% of holders of VET qualifications from the class of 2016 (the last one for which data are available). This being the case, it can be stated that there is a suitable degree of match between total supply of holders of VET qualifications and those which the labour market will require to meet employment opportunities.

TABLE 8 Level of coverage of need for holders of VET qualifications (on average, in 2019–2030) with VET graduates in 2017, by occupational category

	Complete VET in 2017 (no.)	Employment opportunities for VET on average in 2019–30 (no.)	Over (+) or Under (-) coverage (no.)	Coverage rate (%)
Management and Administration	1,296	1,403	–107	92%
Physical and Sports Activities	377	286	91	132%
Farming	194	169	25	114%
Business and Marketing	596	664	–68	90%
Electricity and Electronics	1,414	1,022	392	138%
Energy and Water	26	74	–48	35%
Construction and Public Works	117	200	–83	58%
Mechanical Manufacturing	1,964	825	1,139	238%
Hospitality and Tourism	804	507	297	159%
IT and Communications	933	473	460	197%
Installation and Maintenance	927	702	225	132%
Personal Image	630	331	299	190%
Audiovisual	261	163	98	160%
Food Industries	58	75	–17	77%
Wood, Furniture and Cork	159	109	50	146%
Maritime Fishing	165	120	45	138%
Chemicals	208	156	52	133%
Health Care	1,503	1,596	–93	94%
Safety and Environment	67	34	33	199%
Sociocultural and Community Services	1,390	1,195	195	116%
Textiles, Apparel and Leather	52	47	5	110%
Transport and Vehicle Maintenance	736	642	94	115%
Graphic Arts	211	157	54	134%
Total	14,088	10,951	3,137	129%

Source: Compiled by authors based on Lanbide, work integration; and Futurelan and Basque Subdepartment of VET, education statistics.

Beyond the general degree of match between total holders of VET qualifications and the needs linked to current employment opportunities, it is also necessary to look into the imbalances by occupational category. As we can see from Table 8, there are four occupational categories in which, having a coverage rate of 190% or over, there may be an excess supply of holders of qualifications; and the opposite may be assumed for the six occupational categories which do not attain 100% coverage. If we go beyond individualised enumeration and attempt to draw conclusions regarding a pattern of behaviour, it appears that it is possible to conclude that it is in industrial occupational categories where the overcoverage is most concentrated. Thus, if data for the ten industrial occupational categories are grouped together and the joint coverage rate is calculated, the result is 151%.

It is worth considering whether both the overcoverage of almost 30% obtained for VET as a whole, and the higher overcoverage generally shown in industrial occupational categories, may be related to job losses in industrial sectors projected by Futurelan. As pointed out above, industrial employment requires comparatively more

Overcoverage is largely concentrated in industrial occupational categories

holders of VET qualifications, and insofar as this employment is experiencing negative growth, the demand for these qualification holders will also be negatively affected. Additionally, unlike non-industrial occupational categories (for example, management and administration, IT and communications, business and marketing, etc.), which are most cross-cutting in nature and whose qualification holders can perform their work in a wide range of sectors, qualification holders in industrial occupational categories are, comparatively, more oriented towards performing their activity in the industrial sector (for example, mechanical manufacturing; wood, furniture and cork, etc.). In fact, if rather than looking at the future work integration of the qualification holders, we focus our attention on current work integration rates, the statistics published by Lanbide show that, for holders of VET qualifications who finish in 2017 and have studied industrial occupational categories, the average work integration rate (or percentage of students who answer the survey and are working) was 58%, whereas the rate for those studying non-industrial occupational categories was 49%. Additionally, according to the previous analysis, in the occupational category for which there was the greatest overcoverage (mechanical manufacturing), the work integration rate was even higher (65%).¹²

It is expected that there will be undercoverage for holders of university qualifications, especially in the economic and technical sciences

Table 9 reproduces the previous analysis, but in relation to holders of university qualifications. From this it is possible to conclude that, unlike the case of VET, looking at the relationship between university graduates in 2017 and the employment opportunities which, as an annual average, there will be in the 2019–2030 period, it reveals undercoverage of close to 5,000 graduates, that is, undercoverage of approximately 30%. However, it should be noted that the inactivity rate (that is, those who do not enter the labour market after graduation) in the case of university graduates is much lower (6%, according to the Lanbide survey), meaning that the undercoverage will not experience a large increase for this reason.

TABLE 9 Level of coverage of need for holders of university qualifications (annual average, 2019–2030) with university graduates in 2017, by subject area

	Graduate from university in 2017 (no.)	Employment opportunities for university graduates on average in 2019–2030 (no.)	Over (+) or Under (-) coverage (no.)	Coverage rate (%)
Economic, legal and social sciences	6,215	10,091	–3,876	62%
Experimental sciences	804	752	52	107%
Humanities	995	1,242	–247	80%
Health sciences	1,736	1,596	140	109%
Technical sciences	3,117	4,168	–1,051	75%
Total	12,867	17,848	–4,981	72%

Source: Compiled by authors based on Lanbide, work integration, and Futurelan and Basque Subdepartment of VET, education statistics.

¹² Insofar as the situation in the labour market has improved since then, so too have the work integration rates for holders of VET qualifications, although there are no official data available that are collected by an independent institution and are more recent than those contained in the text, to which we can refer.

By subject area, the greatest undercoverage is found in the areas which are usually mentioned as the most in demand by firms in reports prepared by such organisations as Confebask, Addeco and others: the economic, legal and social sciences (especially business) and technical sciences (especially engineering).

In short, the profound changes in employment by sector, which were described in the first part of this subsection, will likewise require changes in qualifications and skills by the workforce. What is more, the demand for changes in qualifications and skills originating in changes in the sectoral structure (more weight in the services sector), will be reinforced by parallel demand deriving from the change in the weight of different functions within each firm (for example, those involved in production with less and less importance, and those in services with more importance, as the term *servitisation* indicates). The education system must respond to changes in the demand for qualifications by altering the current share of one type of education or another (general or vocational), with changes in the importance of educational levels (e.g., intermediate and higher in VET, undergraduate and master's degrees in the university) and with changes in the fields of study. From the exercise carried out here, considering the impact that changes in the sectoral structure of employment will have on that of qualifications, it would seem we can conclude that the university and more cross-cutting fields of study will experience greater growth than VET and those in sciences and humanities. Nonetheless, we must caution that the forecasts have been made using current hiring structures. Furthermore, the comparative analysis has demonstrated that they lead to a clear mismatch, overqualification, and this overqualification has considerable social (e.g., because educating a university student requires a minimum of four years, whereas a higher VET qualification only requires two years) and personal costs (e.g., frustration due to not using the personal skills one possesses). For this reason, this initial consideration indicates where the current logic of the market may lead. However, it may be desirable to correct this logic by public policies to prevent the phenomenon of overeducation discussed above.

There are two further observations before concluding this section on the analysis of the match between supply and demand. Firstly, it is important to remember that the capacity to change or alter qualifications, and the adaptability of educational institutions, is much greater in the sphere of VET than in the university. But this greater rigidity as regards to changing university qualifications is partially offset by the lesser specificity and greater generality in the education offered by universities, which means that their graduates can adapt more easily to different environments. By contrast, that greater flexibility possessed by the VET subsystem makes it more suitable for tackling the biggest changes taking place in its fields of knowledge, due to their greater specificity and greater focus on sectors such as industry, which are more prone to structural changes.

VET is more specific, but can be adapted more quickly. University education is more general, but less adaptable

Secondly, the match analysis conducted here is restricted to the field of qualifications, and not to skills in themselves. In the area of skills, there are not as many statistics and international classifications in place as there are in the sphere of education levels. Although in theory, every qualifications framework has behind it, or should reflect, a framework of skills and learning outcomes (LO), the progress made thus far in this area is limited (e.g., the skills measured by the PISA programme), and it is an area in which there is still much to be done, both at the international level and in the Basque Country.

3.4 Territorial reflection of trends

This subsection introduces the territory as a diversity factor within the Basque Country and posits the need to work on defining responses to the challenges presented in the previous sections based on coming to terms with the current differences. The situation and needs in the area of skills are different in the counties of Gran Bilbao, Tolosaldea and Montaña Alavesa, and therefore, the response to this diversity of situations must vary in equal proportion.

In order to fulfil the goal set, we now turn to the analysis of territorial diversity in relation to four significant factors in the area of skills: employment by sector, education level of the working population, ageing population, and foreign population. The situation in relation to industry specialisation and orientation of education, for example, will indicate the determining factors and responsiveness of the territory to the changes projected and detailed in Subsection 3.3, which relate to an increase in the weight of the services sector and greater demand for university graduates. Meanwhile, the factors related to the weight of the foreign population and ageing reveal the subregional situation linked to the trends presented in Subsection 3.2.

The county and local realities are different and so the skills policies should vary accordingly

This analysis is performed on the county level,¹³ given that, for reasons of statistical confidentiality, analysis at the municipal level is not possible. Table 10 collects the different indicators related to the factors mentioned for each of the counties in the Basque Country.

¹³ The counties (comarcas) as defined by Eustat were taken into account, although in the case of Gipuzkoa, they have been adapted to the catchment areas of county development agencies. In the case of this historical territory, it was possible to do so with slight modifications. In the two other historical territories, the patterns did not coincide as closely and changing them produced county demarcations that were less clear with a view to data analysis. Therefore, the counties defined by Eustat have been maintained.

TABLE 10 Main indicators by county

Historical Territory	Territory/county	Persons employed in industry (%)	Persons employed in high-tech and medium-to-high-tech manufacturing (%)	Persons employed in low-tech and medium-to-low-tech manufacturing (%)	Persons employed in knowledge-intensive services (%)	Working population with VET education (%)	Working population with university education (%)	Ageing index	Foreign population (%)
	Basque Country	25.9	6.5	12.8	38.4	17.6	24.9	332.3	9.5
	Alava	30.8	8.3	17.1	37.6	17.8	23.4	288.6	11.6
	Bizkaia	22.1	3.8	11	40	17.0	25.8	356.9	8.9
	Gipuzkoa	29.2	9.6	13.3	36.3	18.7	24.2	316.8	9.6
Alava	Valles Alaveses	62.5	35.4	23.1	10.6	31.0	14.9	335.0	9.3
	Llanada Alavesa	25.9	8.1	12.4	42.4	23.7	23.1	283.1	12.5
	Montaña Alavesa	26.1	18.7	11.7	46.0	30.1	14.5	496.6	6.1
	Rioja Alavesa	48.5	3.2	41.3	16.9	22.4	12.5	269.7	11.6
	Estribaciones del Gorbea	53.5	9.6	38.6	16.4	28.5	23.6	241.2	6.8
	Cantábrica Alavesa	47.5	5.8	37.0	25.5	31.3	19.6	329.9	6.7
Bizkaia	Arratia-Nervión	48.7	13.5	29.2	20.5	28.8	21.2	281.9	7.4
	Gran Bilbao	17.8	2.7	7.5	43.6	22.1	27.8	382.3	9.0
	Busturialdea	29.4	2.7	19.5	32.9	22.9	24.4	344.2	9.4
	Duranguesado	39.0	6.8	27.3	27.2	27.5	21.6	269.9	8.9
	Encartaciones	21.5	15.4	9.6	32.5	31.4	16.7	326.2	7.5
	Lea Artibai	43.8	9.0	30.0	24.0	25.4	19.4	365.7	10.3
	Uribe	29.6	8.9	13.3	35.0	20.5	33.2	215.6	7.7
Gipuzkoa	Bajo Bidasoa	20.5	3.8	10.5	30.1	27.1	21.5	315.7	12.2
	Buruntzaldea	40.7	9.0	20.3	21.9	30.4	18.9	280.5	8.3
	Goierrri	54.8	33.4	16.1	21.1	30.8	19.3	246.4	11.5
	Alto Deba	48.0	20.6	23.8	27.7	29.2	23.1	334.4	7.9
	Debabarrena	42.3	16.2	21.0	29.5	28.2	18.7	340.3	9.4
	Donostia	8.2	1.7	1.7	57.4	19.2	35.4	398.1	10.6
	Oarsoaldea	28.2	7.1	13.3	27.5	30.6	16.2	324.4	8.8
	Tolosaldea	44.0	13.1	24.4	26.6	29.0	19.4	259.4	8.5
	Urola Erdia	48.2	12.8	25.7	23.9	25.8	19.4	238.3	8.6
	Urola Garaia	43.0	8.5	27.5	31.1	27.7	18.5	354.0	6.7
	Urola Kosta	31.5	10.1	15.6	27.5	26.4	25.2	250.5	8.2

Source: Eustat. Compiled by authors.

Below are various conclusions derived from analysis of these indicators:

- Valles Alaveses and Goierri stand out in manufacturing jobs with a higher level of technology, together with the counties in central-western Gipuzkoa, Encartaciones, Arratia-Nervión and Montaña Alavesa. The north of Alava and Lea Artibai are also part of the manufacturing core, but with a concentration in manufacturing jobs with a lower technological level.

Industry
specialisation by
urban correlates
to orientation of
education

- It is possible to note the urban nature of the knowledge-intensive services sector, with jobs primarily concentrated in the capital counties, followed by their surrounding counties. Also noteworthy is the case of Montaña Alavesa, although it contains a considerably lower concentration of enterprises than the urban counties (16% compared to 30–40% in the urban counties).
- Industry specialisation by county correlates to orientation of education (general or vocational). The counties where the working population with a vocational education accounts for the greatest share coincide with those with more manufacturing jobs (correlation of 0.49). And the correlation with vocational education is even higher (0.58) for counties with high-tech and medium-to-high-tech manufacturing jobs. In other words, industrial specialisation is linked to a background in vocational qualifications. In contrast, the correlation between manufacturing jobs and population with a university education is negative (–0.5). It is in these counties where the trend of the declining importance of manufacturing activity and decreasing demand for workers with vocational backgrounds may have the greatest impact. In most cases, the concentration of employment in knowledge-intensive services is fed by a working population profile that is strong in university education (0.56 correlation). This is the reason the concentration of population with a tertiary education is higher in the capital counties, where, therefore and a priori, the determining factors for dealing with the anticipated changes are more favourable.
- In relation to the trend of ageing and the growing share of the immigrant population in the territory (see Subsection 3.2), the subregional outlook reaffirms the need to consider the existing differences. The majority of Basque counties have an ageing index of 275–350%. In other words, the population over the age of 65 is practically triple that of those under the age of 15. The ageing process is more marked in Gran Bilbao, Lea Artibai, Donostia and Urola Garaia, and even more so in the case of Montaña Alavesa. The ageing counties appear to reflect two profiles: urban areas whose high level of services and well-being attract older people, who can afford the high prices (especially for housing) found there; and secondly, more rural areas, subject to the phenomenon of depopulation in relation to their industry specialisation in the agro-livestock industry. These differences justify the need to adopt different measures. On one hand, measures which prevent the youth population from being driven out of the cities; and on the other, the development of economic activities which keep the youth population in those ageing counties specialising in the primary sector.
- The indicator corresponding to the concentration of foreign population shows the existence of a greater concentration of foreign residents in the counties of Bidasoa, Llanada Alavesa, Goierri, Lea Artibai, Rioja Alavesa and Donostia. Due to the fact that one of the challenges with regard to the foreign population lies in adapting their skills to meet demand, this analysis encourages reflection on the mechanisms for this adaptation currently in place at the subregional level. The ability to attract foreign residents will vary depending on the conditions offered at the local level, although they depend on legislative frameworks and procedures in which the subregional government has a limited role.

This analysis demonstrates the importance of delving into subregional observation. In fact, regardless of how the processes to improve competitiveness are designed by the bodies operating at the level of the entire Basque Country, with the

Basque Government at their head, each municipality, county or historical territory constructs or can construct its own approaches and align its efforts around what it believes is best (see Box 3 and Box 4). Once again, the key will be to build processes of dialogue and seek agreements between different levels of government and public administrations. Doing so will require an ongoing assessment of territorial diversity that will make it possible to understand why each one adopts the strategies it adopts and how to find areas for collaboration.

Ongoing assessment of territorial diversity and building spaces for multilevel dialogue will make it possible to identify areas for collaboration

BOX 3 Vocational education and training and advanced services in Bilbao

The Bilbao Next Lab project, developed by Bilbao Ekintza-Bilbao Council and Orkestra, is designed to stimulate smart specialisation in the sphere of knowledge-intensive services in that city. The action research process being carried out as part of this project seeks to tackle, among other things, the challenge of developing talent by means of a comprehensive VET system (that is, which takes into account both initial VET and VET for employment) focused on advanced services. The project thus asserts that urban regions seeking to develop advanced services require people with a VET background, although in different occupational categories from traditional industries.

The analyses carried out up to the writing of this report show that firms providing advanced services (AS) in Bilbao primarily employ people with a university education. The exception is motion picture, video and television programme production, sound recording and music publishing; and telecommunications, where the hiring percentage for people with VET is higher than that for people with a university education. The activities which fall under AS account for 12% of all people in work with a vocational education in Bilbao. It is worth mentioning that the areas of AS activities in which the most people with a vocational education are employed are: scientific and technical professional activities, with 57%, followed by information and communications, with 28%, and financial activities and insurance, with 16%.

The involvement of various stakeholders in the initiative (Basque Subdepartment of Vocational Education and Training, Lanbide, Basque Department of Labour and Social Policy, Gaia Cluster Association, together with Bilbao Ekintza and Orkestra) makes it possible to construct shared agendas through the action research process, and to demonstrate that work at the local level facilitates incorporating stakeholders that at higher territorial levels, often tend to function in silos. The goal is to define joint actions that expand opportunities for developing a comprehensive VET system for skill formation in AS.

VET emerged in connection with industrial activity, but – as the innovation economy demonstrates – the productive fabric needs ‘ambidextrous organisations’ which combine different types of knowledge and modes of innovation, where advanced services can play a key role. Furthermore, it is important to highlight that the relationship between VET schools and the industrial sector differs from the relationship between VET schools and AS. For example, whereas VET institutions do not compete with industrial firms in the provision of services for innovation or VET for employment, it is highly likely that this will be the case with AS firms. It is advisable to further our knowledge of this relationship in order to design initiatives which, in addition to strengthening the VET system and the overall competitiveness of the system, also have a positive impact on the competitiveness of AS. More so if we consider that, in addition to progressive urban concentration on a worldwide scale, the services sector is becoming increasingly important within the global economy.

BOX 4 Local initiatives to match supply and demand of skills

Geographic proximity is a factor which helps to bring educational institutions and firms closer together, and which fosters feedback and adaptation in both supply and demand of skills. This reasoning is confirmed by the various initiatives being undertaken in the Basque Country, facilitated by agencies or entities for local and county development. This is the case of Talentatu in Lea Artibai; Elkarrekin Eraikitzen in Urola Erdia; the HEZ-IN project in Goierri; Urola Garaia and Debagoiena in partnership with the Provincial Council of Gipuzkoa; and Bilbao Gazteak Sortzen in Bilbao.

One common element among these initiatives is the creation of spaces for dialogue between firms and educational institutions, with the aim of developing and retaining talent in their respective counties and municipalities. The result is reflected in the creation of specific modules or content covered at the educational institutions, in which the firms are active participants to support the development of students' skills. These cover a range of areas, from development of cross-cutting or STEAM skills to fostering an entrepreneurial culture through projects proposed by firms or other entities, or through innovative learning and assessment methodologies. Normally, they involve secondary and upper secondary students, although some initiatives also include primary or university and vocational education and training students.

These initiatives enable the practical application of knowledge and project-based learning; they bring the business reality into the classroom, thus facilitating guidance work at educational institutions; and contribute to boosting a sense of belonging to the firm and the territory.

Some of the factors that foster starting and developing such initiatives reside in longstanding relationships between the stakeholders involved. In addition, the creation of spaces for dialogue is often the result of a commitment to the socio-economic development of the county or municipality. It is also important to note the central role exercised by agencies as stakeholders facilitating these initiatives. Building a shared vision among spheres that have developed along an almost parallel course is complex. Furthermore, staff turnover and the rigidity of procedures at educational institutions, as well as the difficulties entailed by involving a group of firms with different paces and profiles, are some of the most common challenges they face in their facilitation work.

4

Skills formation

4.1 Typology of skill formation systems

There are a number of criteria for classifying skill formation systems. According to the typology set out in Table 11, a major distinctive criterion is that which differentiates countries in which the majority of initial education is general in orientation (such as the case of liberal market economies, LME, like the United States) from those countries where vocational education and training has a strong presence and is more specific in nature (the case of coordinated market economies, CME, like the countries of Central and Northern Europe). The greater vocational specificity of the education system in CME is linked to the greater share of mid-level technical skills in the workforce, to a higher level of regulation and social protection, and to greater specialisation in the medium-to-high- and high-tech manufacturing industry. By contrast, in LME, labour market regulations, welfare state benefits, the share of mid-level skills and the share of the manufacturing industry are usually lower. As a result, there is considerable polarisation of skills between one segment of the working population that is highly skilled, with tertiary education and employed in science-based or advanced services industries, and another large portion of the population, which has a relatively low skill level and is employed in traditional services.

TABLE 11 Typology of skill formation systems in advanced economies

		Involvement of firms in skill formation	
		Low	High
Vocational specificity of the education system	Low	Liberal system of general skills (United States)	Segmented, firm-based skills system (Japan)
	High	School-based statist occupational system (Sweden)	Collective, position-based occupational system (Germany)

Source: Based on Busemeyer (2009).

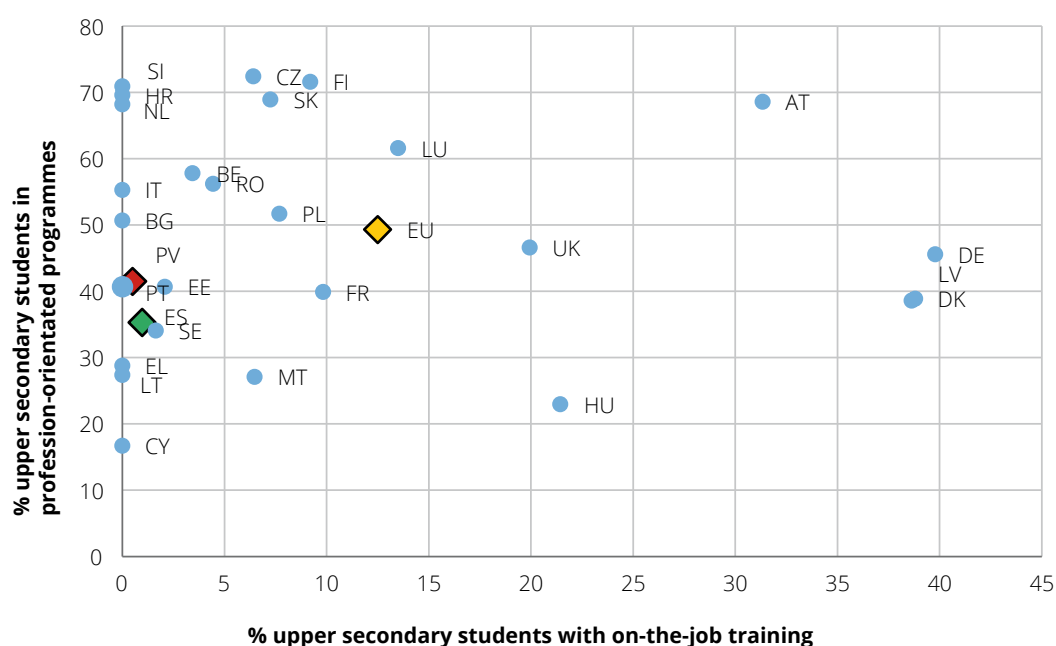
As regards to the second criterion, the involvement of firms in education and training may come about either because they partner and have a close relationship with the education system that carries out the initial VET (for example, with dual or apprenticeship programmes), or because they provide training for their employees them-

selves. Thus, whereas in LME (United States), firms invest little in training their employees (except for their managers and research staff), in CME, this is more common. In the Germanic countries, the dual training model is highly developed; and in economies such as Japan, with hardly any students enrolled in VET, large firms invest heavily in continuing education for their workers.

Graph 6 shows the indicators for the vocational orientation of the education system and the involvement of firms in training and education. From this it is possible to conclude that, although higher than in Spain (35%), the percentage of upper secondary students who enrol in profession-orientated programmes is lower in the Basque Country (42%) than in the EU-28 (49%). Likewise, the percentage of upper secondary students who combine learning at school and on the job is much lower in Spain than the average for the EU (1% compared to 12.5%); and in the Basque Country it is even lower than the Spanish average (0.5%). The latter case is due to the fact that the Eurostat indicator does not take higher vocational education and training (VET) into account (which is where Basque dual VET is concentrated) and that, while Basque dual VET is for the most part apprentice training (including an employment contract), in a good part of Spain, it is simply on-the-job training (OJT) spread out over time.

The Basque system of skills is characterised for prioritising professional education with a low level of participation by firms

GRAPH 6 Percentages of upper secondary students enrolled in profession-orientated programmes and with work-based learning processes (2017)



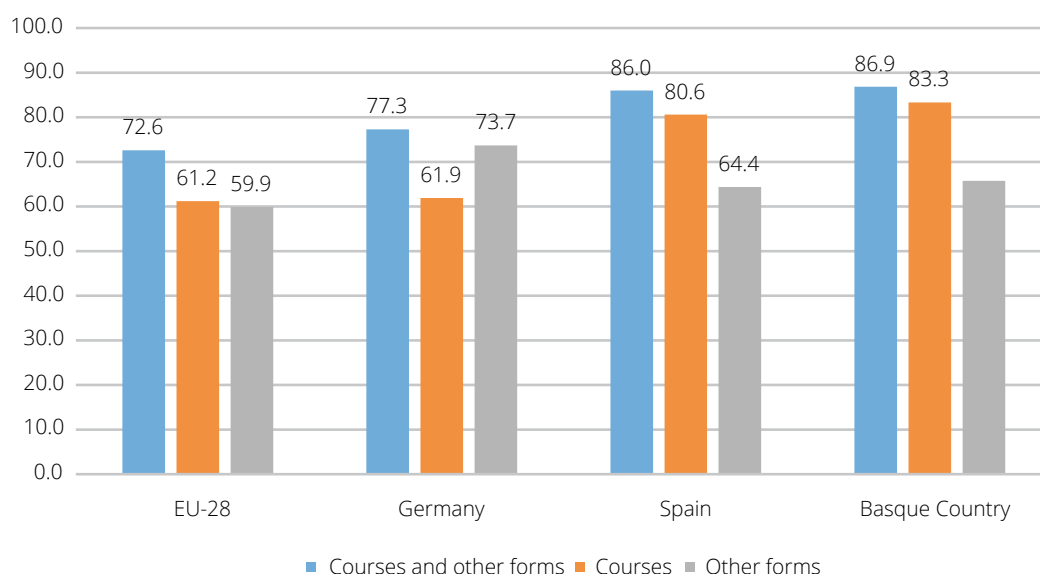
Source: Eurostat, Ministry of Education and Vocational Training. Compiled by authors.

NB: The figure for the Basque Country has been estimated by amending the Spanish average based on the percentage of dual VET students (basic and intermediate) in relation to total VET students (for the same levels) in the Basque Country and in Spain as a whole.

As regards to the involvement of firms in their employees' continuing education, from the five-year EU survey on continuing education, shown in Graph 7, it is possible to conclude that the percentage of firms that provide training for their employees is about 73% in the EU-28, 77% in Germany, and in Spain and the Basque Country, it is up to 86% and 87%, respectively. The high values for Spain and the Basque Coun-

try may be due to the fact that their firms and workers are required to pay Social Security contributions for vocational education and training, and that they have access to credit for the training expenses incurred by the firm, charged to these contributions. In this regard, Spain is ‘the country with the greatest “government intervention” in the funding of firms’ continuing VET activities’ (Pérez-Díaz and Rodríguez, 2002, p. 308). Even so, the percentages of firms engaged in training in Spain (86%) and the Basque Country (86.9%) are behind those attained by Sweden (93.1%).

GRAPH 7 Percentage of firms with ten or more employees that provide training for their employees, by training format (courses and other formats) (2015)



Source: Eurostat, survey on continuing vocational training at firms; and Ministry of Labour and Social Security, Annual Labour Survey.

NB: Estimated data for the Basque Country, amending those for Spain based on the percentage of firms engaged in training published in the relevant ministry statistics for Spain and the Basque Country for 2015.

However, in order to evaluate training activities, it will be necessary to also look at the types of skills developed. According to the CES (2015), such training is highly concentrated in a few occupational categories (management and administration, security and environment, etc.) which have little connection to the technical skills and key sectors of the productive fabric, a judgement which, as we will see below, is also applicable to incentivised training by Basque firms. From Graph 7 it is possible to conclude that in EU firms, non-formal training (in other words, that which does not lead to any qualification and is based on job rotation, quality circles, etc.) is as common as course-based training, and that at German firms it is clearly even more common, while in Spain and the Basque Country, the latter is much more frequent than the former.

Incentives drive the provision of training activities among Basque firms, although not strategic in nature

4.2 Trends and challenges in skill formation systems

Just as there are overarching megatrends which affect the demand for skills (see Subsection 1.1), in relation to providers of training in these skills, we also see a number of trends which should be highlighted. They are shown in Graph 8.

GRAPH 8 Trends in skill formation systems

One major trend, linked to the pact for the development of the welfare state following the Second World War, as well as the shift to the knowledge society, is the general increase seen in the education and skill levels of the population. In terms of the education level, this is reflected in a considerable increase in the population with tertiary education in all countries (levels 5–8 of the International Standard Classification of Education, ISCED), whereas the percentage of the population with an intermediate education level (ISCED levels 3–4) remains the same (the case of Spain) or has even declined (in the others) (see Table 12).

From Table 12 we may also conclude that the trend of an increase in the population with tertiary education is still underway throughout the EU-28. In coordinated market economies, such as Germany, where the intermediate level (upper secondary) was most prevalent, there is now a shift to tertiary education. In 2007, when the crisis erupted, a high percentage of the population in Spain already had a tertiary education. That percentage was even higher in the Basque Country, a territory which attained a rate of 62% in 2009. This was quite a bit higher than that found in a liberal market economy, such as the United States (44% in 2010), despite the polarisation towards tertiary level general education which characterises the American economy. But in the 30–34 age band, the trend

Growth of the population aged 30–34 with tertiary education has topped out in the Basque Country

towards growth in the percentage of the population with a tertiary education seems to have reached its peak in the Basque Country and Spain, and it seems difficult that the rates attained in the early part of the 2010s will be exceeded.

TABLE 12 Indicators characterising training and education systems in the Basque Country, Spain, Germany and the EU-28

			2000	2007	2018	2030
Population aged 30–34 with tertiary education (%)	Secondary education (ISCED 3–4)	Basque Country	23.5	17.5	20.7	n.d.
		Spain	21.7	24.2	24.2	n.d.
		Germany	50.8	48.3	48.0	n.d.
		EU-28	59.5	58.6	57.9	n.d.
	Tertiary education (ISCED 5–8)	Basque Country	44.6	59.3	57.1	n.d.
		Spain	29.2	40.9	42.4	n.d.
		Germany	25.7	26.5	34.9	n.d.
		EU-28	22.1	30.0	40.7	n.d.
Distribution of total employment by skill level	Middle-skill (ISCO 4–7)	Basque Country	n.d.	38.0	46.7	51.7
		Spain	19.4	24.4	26.7	32.2
		Germany	57.8	59.4	60.4	59.9
		EU-28	46.7	49.4	48.0	45.0
	High-skill (ISCO 1–3)	Basque Country	n.d.	40.5	33.9	32.2
		Spain	27.3	33.8	38.5	39.0
		Germany	24.9	25.8	27.1	29.1
		EU-28	23.2	26.1	33.4	40.8
Participation of the population aged 25–64 in training/education and learning (in the last 4 weeks)		Basque Country	4.9	13.6	12.7	n.d.
		Spain	4.5	10.8	10.5	n.d.
		Germany	5.2	7.8	8.2	n.d.
		EU-28	7.1	9.4	11.1	n.d.

Source: Eurostat, Cedefop and FutureLan.

It should be noted that the growth in tertiary education described above is not necessarily academic in nature. It is in fact at the tertiary levels where vocational education and training is experiencing the highest growth. In the case of Spain and the Basque Country, this trend is reflected in the greater dynamism in enrolment and graduation reported by higher VET (which corresponds to a tertiary education level). From this it is possible to conclude that the serious problem of overqualification which, as discussed in Subsection 2.3, the Basque Country is experiencing, will tend to increase even more, according to current trends in the economy. And as a result, it will be all the more urgent to take measures to correct this. From a social perspective, the most ideal path to follow is to increase the share of level 1–3 occupations in the Basque economy. For the EU-28, these are expected to account for 40.8% in 2030, while in the Basque Country this figure will only be 32.2%. This essentially involves demand-side industrial and technology policies which increase the share of these occupations at firms.

Table 12 also shows employment data, not in terms of education level, but skill level, which is determined based on the major groups (one-digit) in the International Standard Classification of Occupations (ISCO). Thus, the major groups 1–3 are considered high-skill, 4–7 are middle-skill, and 8–9, low-skill. Additionally, in comparison with the data by education level, the data by skill level have the advantage of not ending in 2018, in that they include projections for employment trends by skill level up to 2030, produced by Futurelan (Basque Country) and Cedefop (Spain, Germany and EU-28).

Up to 2018, in highly skilled jobs we do not see major differences compared to the trends observed in the analysis by education level, except that the drop in relative share is much more marked in the Basque Country than that provided by the education level data. The forecasts for the 2018–2030 period also show that, whereas in Germany, and especially in the EU, it is expected that the relative share of highly skilled jobs will increase, in Spain there are no major changes, and in the Basque Country, the relevance of highly skilled jobs will continue to decline.

As regards to middle-skill jobs, the most significant aspect is the marked growth seen in Spain, and particularly in the Basque Country, up to 2018. Forecasts indicate that this growth will continue until 2030, so that in 2030 these occupations will account for more than half of the employment of all skill levels in the Basque Country. This percentage (52%) still falls short of Germany's (60%).

A second clear trend concerning training and education supply is that these activities are not limited to initial education (for young people, prior to their entering the labour market), but they extend throughout the entire working life. From Table 12 it is also possible to conclude that, although this trend is clear in the EU-28 as a whole, and to a lesser extent, in Germany, Spain and the Basque Country, the limit in this regard was reached in the second half of the last decade, and since then the rate has hit a plateau, or has even dropped back a little. In the case of the Basque Country, although the rate achieved is high (12.7%) compared to the European average, it still falls short of countries such as Sweden (29.2%) and Finland (28.5%).

People continuing to learn following initial education has been stagnant in the Basque Country since 2007

Educational institutions need to address this trend by diversifying their education and training activities, so that, rather than concentrating on initial education and training (for young people), educational institutions tackle the challenge of increasing their presence in training and education for adults, in general, and training and education for employment, in particular. Linked to this, a change in the teaching format for education and training is required (for example, strengthening the dual format or giving more importance to online teaching, or less traditional timetables).

At the same time, educational institutions are further diversifying the activities or services they provide. That is to say, the third major trend observed on the supply side of the skills system is the diversification of functions and activities at educational and training institutions. At universities, this trend is linked to the development of the third mission and what is known as the entrepreneurial university (Etzkowitz, 2003), whereas in the case of VET, it involves transforming a good portion of what were previously single-purpose schools into multifunctional centres (Navarro, 2018a).

A fourth change or trend in the skill supply system is the shift from organising qualifications in the form of inputs or knowledge which the curriculum should contain, to organising them around skills or learning outcomes (LO). The shift to this system, begun in the sphere of VET in the United Kingdom in the 1980s, then expanded to other countries and spheres of the education system (including the university) (see Box 5).

The Basque Country has not been immune to the change taking place around it in the education and training system with the application of the outcome-based approach. With the entry into force of the LOGSE Education Act (passed in 1990, which included a skills-based curriculum and made some decentralisation possible in the preparation of curriculums), the First VET Plan passed in 1997 began the implementation of the Integrated Qualifications and VET System, which, although inspired by the British system, also contained elements from other neighbouring countries and was adapted to fit the situation in the Basque Country (López-Guereñu, 2018a). In addition to reflecting purely educational aims, this system was viewed as a tool of industrial and employment policy, and in short, for improving competitiveness and the economy.

The Basque Country was a pioneer in adopting the outcome-based system and qualifications frameworks

To define the structure and maintain the level of quality and social empowerment of the qualifications system, the Basque Institute of Vocational Training Qualifications was created in 1998. Checking in with firms ensured that the defined standards and the assessment systems were suitable for the reality of production activity. The Integrated System has evolved into the current Basque Framework of Vocational Qualifications and Specialisations (MVCEP), in force since the 5th Basque VET Plan was passed. The MVCEP is part of the Basque Framework of Qualifications for Lifelong Learning defined in the Basque Country in 2013.

Alongside the changes taking place in the national qualifications frameworks, we find a fifth trend in the institutions that make up the supply-side of skills systems: a growing permeability, both horizontal (between different types of education pathways) and vertical (between different education levels within a given pathway). VET, traditionally considered terminal in nature (that is, for immediate entry into the job market), is progressively losing that quality. Possibilities are opening up to allow an evolution from lower stages to higher stages within VET, or to create 'gateways' which make it possible to continue the learning process in general or university studies after completing VET studies (see Box 8). Likewise, the processes for recognising skills acquired by different paths within formal education and training make it possible to establish interconnections between the worlds of work and education.

There is a sixth trend linked to the hybridisation of the different paths to skills acquisition. In general education, the teaching of applied and practical knowledge is reinforced; but alongside this, in VET we can see a certain 'academisation' of training, especially insofar as VET studies lay the groundwork for tertiary education. In both, we are seeing a growing importance of online training and education.

BOX 5 Organising education and training systems by learning outcomes

The expression ‘shift to learning outcomes’ (Cedefop, 2009) designates the growing use of learning outcomes (LO) when it comes to designing and organising the education and training system. This radical change has altered the way in which education is understood, governed, designed, planned and presented (Souto-Otero, 2012), and has altered the role of individuals and stakeholders in the education and employment subsystems (Adam, 2006; Cedefop, 2011). In essence, the outcome-based approach is based on the premise that the education process should be organised based on achieving certain predetermined results, the LO, rather than strictly reflecting a curriculum of theoretical knowledge to be acquired (input-based approach).

The British vocational qualifications system (National Vocational Qualifications) implemented in the 1980s can be considered the first application of this approach in Europe (Allais, 2014; Jessup, 1991). The intention was to pursue more practical training, based on prior definition of professional standards starting from the desired LO, and prevent educational institutions from offering training more suited to their interests, rather than aligned with the needs of the job (‘provider capture’; Raggatt and Williams, 1999).

To the extent that the LO have been defined frequently in terms of skills, this approach has also been referred to as skills-based learning. Defining the LO and implementing the qualifications frameworks entails the participation of the various stakeholders associated with the skills systems (especially the education system and business), promoting a more collaborative model and systems that better meet the needs of the labour market (Grootings, 2007; Tuck, 2007).

Since then, and increasingly, different governments have based their education reforms on this approach, progressively extending it to all levels of education. The process has culminated with the establishment of the European Qualifications Framework. This achieved three main goals: one, encompass both general education and VET within the frameworks, fostering the interconnection and integration of the two types of education and training; two, recognition of both formal and non-formal or informal learning outcomes, thus acknowledging the role of firms within the education and training system; and three, foster transparency and mobility, within and among the national education and employment systems (Markowitsch and Luomi-Messerer, 2007).

The development of cross-cutting skills at educational institutions is increasingly more important

This last trend relates to the fact that teaching technical skills has become less important and there is an increasingly unanimous belief in the importance of cross-cutting skills. Whereas these were previously believed to develop naturally on the job, now there is growing demand for this to be taken on by the education system, and both VET schools and the university are unveiling interesting initiatives in this regard. The Ethazi VET programme, for example, offers a novel methodological framework for the development of cross-cutting skills in students based on presenting problems to be tackled using a multi-disciplinary approach. In the case of universities, the 1999 Bologna Declaration established the need to change the models for the development and assessment of skills. Since then, many universities have defined the cross-cutting skills on which they focus their education offerings. The three universities with their headquarters in the Basque Country have also joined this trend (see Subsection 4.3).

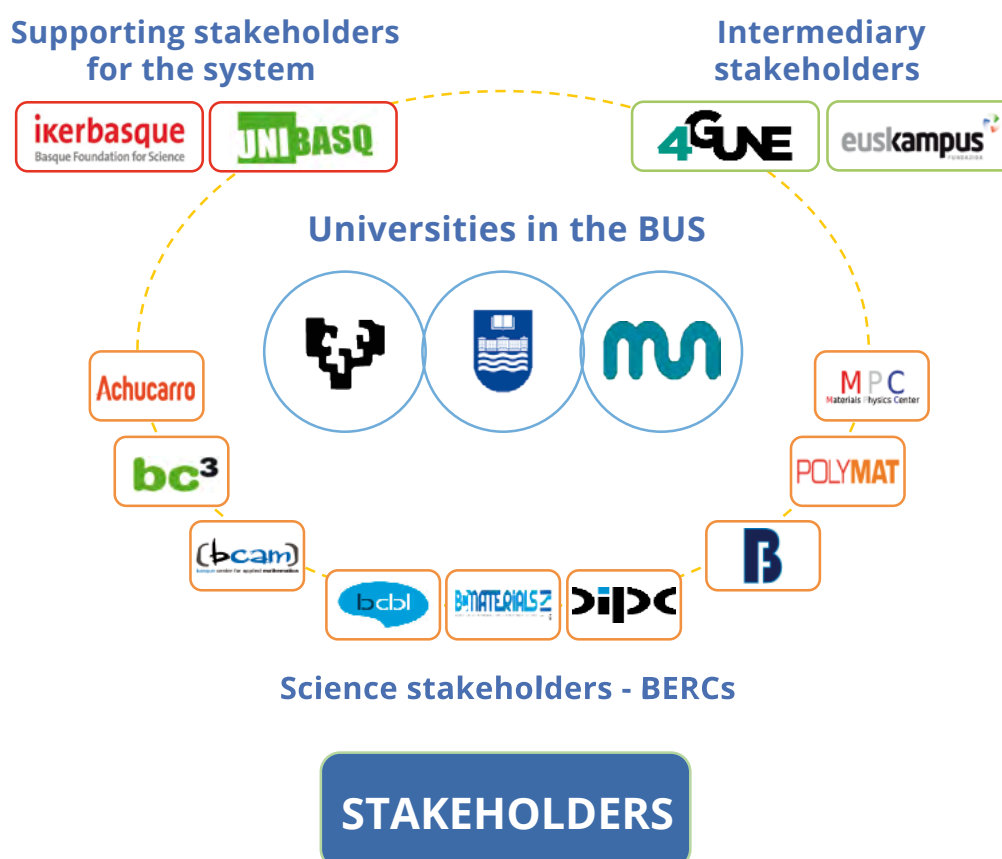
Below, in specific subsections, we will analyse the unique problems of each one of the three major worlds that make up the skill provision system in the Basque Country: the university system, the VET system linked to schools, and the provision of training by firms.

4.3 The university system in the face of challenges in skills and qualifications

The Basque university ecosystem is made up of the following types of institutions (Graph 9):

- three universities with their headquarters in the Basque Country (Public University of the Basque Country/Euskal Herriko Unibertsitatea (UPV/EHU), University of Deusto (UD), and Mondragon Unibertsitatea (MU));¹⁴
- two supporting stakeholders engaged in recruiting talent and certifying quality (Ikerbasque and Unibasq);
- two intermediary stakeholders that coordinate the science and technology stakeholders (Euskampus and the 4Gune training cluster – see Box 6);
- a group of Basic and Excellence Research Centres (BERC).

GRAPH 9 Basque university ecosystem



Source: Basque Government, 2019–2022 University System Plan.

¹⁴ In addition to these, also noteworthy in the Basque Country is the activity of Tecnun, the graduate school of engineering found in San Sebastián, part of the University of Navarra, as well as the UNED (National Distance Learning University) with its three associated sites (Bergara, Portugalete and Vitoria-Gasteiz).

BOX 6 4gune Cluster

Led by the Basque Department of Education and eleven university schools in the Basque Country, the Cluster for University Training in Engineering, Science and Technology, 4gune (www.4gune.eus) began operating in July 2017 with the aim of helping to strengthen university–business cooperation in the Basque Country on the new global stage under the paradigm of Industry 4.0. The goal of this is to enable smart specialisation to act as one of the core elements for training human capital, and in turn, contribute to the sustainability of this strategy.

Highlights among the results of this cluster’s activity in 2018 include the creation of a map of research capabilities, which has made it possible to map 222 capabilities (educational, research, transfer and equipment) in the 50 categories of Industry 4.0. Additionally, the opening of the Automotive Intelligence Center AIC-Open University is the result of the co-creation developed among the stakeholders involved in the cluster. This centre makes it possible to respond to the real challenges of AIC firms through the work of university students and acts as an entrée into the labour market, the continuation of their academic studies, and improvement of the university–business connection.

Almost 60,000 students enrolled in Basque universities represent 3.7% of those in Spain, as well as 31% of the population of the Basque Country aged 20–29. In terms of population studying at university, Basque universities have similar percentages to those in Spain (according to the Ministry of Science, Research and Universities, MCIU, it is slightly lower; and according to Eurostat, it is slightly higher). And in turn, the Basque Country and Spain are a little above Germany and the EU-28.

Also in the Basque Country the majority of students study at public universities (75%), this percentage is lower than that for Spain (83%). Like the most advanced autonomous communities in Spain (Madrid, Cataluña and Navarra), the Basque university system is characterised by a relatively larger presence of private universities. In general, the scope of the former is greater than that of the latter, this being particularly true in the Basque Country, due to the considerable size of its public university (more than 43,000 students, compared to the average of 26,000 at Spanish public universities). In both the Basque Country and Spain as a whole, the percentage of female students now exceeds 50%, being slightly higher at private universities than at public ones.

As a whole, in relation to the Spanish average, the Basque Country is noteworthy for a somewhat smaller share of master’s degrees, and somewhat greater share of undergraduate and doctoral degrees. Additionally, Basque universities stand out for their greater specialisation in engineering and architecture and in social and legal sciences; and for a smaller share of health sciences and of arts and humanities. This situation is partly due to the different specialisation of Basque private universities in comparison with Spain.

Table 13 provides a more in-depth look at the strategic positioning of Basque universities. As we can see, the UPV/EHU is approximately 4.5 times larger than the UD and 9 times larger than MU. In addition to its larger size, which enables it to offer a more comprehensive range of different branches of knowledge, as at other public universities, the activity of the UPV/EHU is most heavily concentrated in undergraduate degrees. The private universities (especially Deusto), still mainly supported by undergraduate courses, pay more attention to master’s programmes.

TABLE 13 Positioning of Basque universities in the 2019 IVIE U-Ranking

	UPV/EHU	Deusto	MU	Spain
Type	Public	Private	Private	84 univ.
Students: vocational 1 and 2, undergraduate and master's	38,717	8,998	4,208	17,033
Students: undergraduate and vocational (% total)	91.5	80.4	86.3	85.7
Students: master's (% total)	8.5	19.6	13.7	14.3
Overall: ranking out of 11	7	6	8	6.8
Overall: index (avg. for all universities = 1.0)	1.0	1.1	0.9	1.0
Teaching: ranking out of 8	5	2	2	4.4
Teaching: index (avg. for all universities = 1.1)	1.0	1.3	1.3	1.1
Research: ranking out of 17	7	9	15	8.9
Research: index (avg. for all universities = 1.0)	1.2	1.0	0.4	1.0
Innovation and technology: ranking out of 24	17	19	11	13.5
Innovation and technology: index (avg. for all universities = 1.1)	0.7	0.5	1.3	1.1
Teaching success rate	55.0	87.0	85.0	55.0
No-dropout rate	73.0	86.0	100.0	70.0
Doctoral dissertations defended/Doctoral teaching & research staff	28.0	53.0	23.0	38.0
Continuing education admissions (per doctoral lecturer)	23.0	43.0	48.0	28.0

Source: Ministry of Science, Innovation and Universities (MCIU), university statistics. IVIE-BBVA, 2019 U-Ranking.

En el U-Ranking de 2019 que publica IVIE-BBVA, las universidades vascas se sitúan en una posición intermedia:

- In teaching, the two private universities – Deusto and MU – clearly stand out compared to the UPV/EHU, which is slightly below the Spanish average.
- In research, the UPV/EHU stands out (above the Spanish average); closely followed by the UD, which is close to the Spanish average; and MU, which ranks the lowest.
- In innovation and technology, in contrast, it is MU which stands out, ranked ahead of the Spanish average; the UPV/EHU and UD have worse results.

The Basque university ecosystem is rich and diverse, including public and private universities with different areas of specialisation

Given the focus on skills in this report, if we look at the U-Ranking indicators most directly linked to this area, good results for private universities in undergraduate education are confirmed (see the results for teaching success rate and no-drop-out rate), compared to the intermediate values reported for the UPV/EHU. In education of researchers (measured by doctoral dissertations defended/per teaching and research staff member with a doctoral degree), the UD stands out positively. Despite being more poorly ranked in research than the UPV/EHU, it more effectively pursues the combination of this function with training of doctoral researchers. Lastly, in involvement in continuing education, the Basque private universities once again seem more involved than the UPV/EHU (see Box 7).

BOX 7 Mendeberri MU programme

In carrying out their education function, Basque and Spanish universities have essentially concentrated on presenting regulated undergraduate and postgraduate (master's or expert and doctoral courses) courses. In contrast, there has been very little development of other types of programmes with a shorter duration, modular format or adapted specifically to the needs expressed by those demanding the course (or identified as unmet needs in certain occupations or functions by the educational institution). These can be especially valuable when it comes to stimulating lifelong learning pathways. These are the types of training and education (short-term, modular format, applied or practical, etc.) sought by firms or the people who hold management positions or those with higher technical qualifications. Such courses are also frequently linked to prior consulting or applied research activity carried out by the university teaching staff, which either has enabled them to learn about the specific problems faced by the company, or to enable the firm to effectively apply the recommendations resulting from the consulting activity requires prior training and education of staff.

The Mendeberri 2025 project at Mondragon Unibertsitatea (MU) proposes a flexible and novel education offering which includes the modular elements of training programmes linked to personalisation and interdisciplinarity, and the experiential learning of students. This initiative involves creating joint learning frameworks with various stakeholders (firms, institutions, social organisations, etc.) which enrich the student's learning experience through dual education, social and solidarity initiatives, or entrepreneurship. The experience of Mendeberri demonstrates that presenting this type of programme does not require merely modularising the content of a longer academic curriculum, but also a distinct manner of teaching and evaluating learning, timetables and spaces for the education that are outside the ordinary, and a teaching staff who in addition to academic qualifications, have industry or consulting/applied research experience.

We will now analyse two ways in which the university system has developed linked to the trends and resulting challenges of the skill formation system mentioned above: stimulating the extension of learning by means of training activities following the completion of the initial education stage and the commitment to acquiring different types of skills.

It should be pointed out that, as noted at the start of this section, the three universities with their headquarters in the Basque Country have worked on defining the cross-cutting skills which are common to their entire student body. Evidence of this are the Catalogue of Cross-cutting Skills common to all students produced by the UPV/EHU, the Map of Cross-cutting Skills by the UD and the Mendeberri 2025 programme at MU (see Box 7). Table 14 shows the cross-cutting skills selected for these documents and programmes. There are several found at two universities and three skills shared by all (communication and multilingualism; problem-solving, independence and decision-making; and teamwork).

As previously stated, the paradigm shift in teaching format, diversification of education and training activities, and reinforcement of links with the business sector are key when it comes to determining training and education offerings to develop skills. In this regard, dual education and alumni networks can play a central role which still has much scope for action in the university world in the Basque Country and contribute to the aforementioned challenges. The 2019–2022 University System Plan (USP) also highlights the challenge of stimulating a stronger relation-

ship between the university and the business sector, with the aim of responding to the country's challenges (see Box 6), as well as with VET schools to foster employability (see Box 8).¹⁵

TABLE 14 Cross-cutting skills prioritised by Basque universities

Cross-cutting skill	University of the Basque Country	University of Deusto	Mondragon Unibertsitatea
Lifelong learning		x	x
Self-awareness		x	
Communication and multilingualism	x	x	x
Digital	x	x	
Entrepreneurship, innovation and creativity	x	x	
Leadership		x	x
Critical thinking	x	x	
Problem-solving, independence and decision-making	x	x	x
Ethics, social and environmental responsibility and commitment	x	x	
Teamwork	x	x	x
Global outlook			x

Stimulating dual education is among the paths to promote the development of skills through a stronger relationship with the business sector. Although much more recently than in the area of VET, the university has also begun, and is still in the early stages, to incorporate dual programmes into its educational offerings. This is a paradigm shift which is still running up against major barriers, as the aim is to stimulate joint responsibility between organisations and the university in all stages of the learning process. This will make it possible to broaden and enrich the ecosystem of stakeholders linked to the university, expand its educational offerings, and create new spaces, new methodologies and new roles.

The Basque university has begun to gradually offer dual programmes

Unibasq is the body that grants accreditation to obtain 'dual education or university-business alternance' status. In the 2018–2019 academic year, the three Basque universities added four dual undergraduate qualifications, twelve dual undergraduate pathways, six dual master's qualifications and four dual master's pathways. The majority of these programmes are offered for technical courses, such as engineering, or linked to business activity, such as business administration and management or entrepreneurship.

¹⁵ The University+Business axis of development, which is given a priority role in the USP, was preceded by the Basque University Business Strategy 2022, implemented in mid-2017, which facilitated the involvement of Confebask in the Basque University Council. The main aim of this axis is the training and education of highly capable human capital, with an applied component and adapted to suit the needs of the business world.

BOX 8 Collaboration between VET schools and universities

This box discusses the training and education offerings which the three universities with headquarters in the Basque Country offer in partnership with VET schools.

Mondragon Unibertsitatea offers higher vocational courses at two of its schools (Higher Polytechnic School and Faculty of Business Studies). This integration helps to identify synergies and collaborations among the different training and education formats offered by the university. Additionally, it is worth mentioning that for the 2017–2018 academic year, MU implemented an undergraduate course in mechatronics engineering to meet demand for people with backgrounds related to industrial automation and Industry 4.0. This is a dual undergraduate degree intended primarily for students coming from VET in the mechanical manufacturing and electricity and electronics categories, who are given credit for one full year in the second year of the undergraduate course.

In the case of the University of Deusto, the UD-Egibide dual undergraduate degree in digital industry is offered as part of the Deusto Social Lab initiative, which encompasses a wide range of strategic actions aimed at facilitating a paradigm shift and driving processes for supporting individuals throughout their lives, through continuing education, dual education, innovation, employment and entrepreneurship. The course was first presented in September 2018 and seeks to address two needs in Alava's business sector: one, producing people with the necessary background to adapt industry to areas such as digitisation, smart manufacturing and production systems, and the Internet of Things; and two, preventing the difficulties involved in hiring people with such backgrounds, by means of a dual model which incorporates students into the workplace from the second year of their undergraduate degree. To this end, a decision was made to reinforce the higher VET courses for the electronics, computer science and mechanical manufacturing occupational categories presented by Egibide with computer engineering knowledge from UD. After a first year focused on developing basic knowledge, the remaining years are presented in the dual format. In the fourth year, with their final project, students develop a proposal in which they take a traditional element of industry and work on its digitisation.

The Machine Tool Institute (IMH)-UPV/EHU dates back to 1996, when the IMH Dual School was created. It was a pioneer in Spain in presenting university courses in alternation and linking vocational education and training to university education. In 2011, the IMH Dual School of Engineering became part of the UPV/EHU, offering an undergraduate engineering degree in process and product innovation starting in the 2012–2013 academic year. Today, the IMH has expanded the model with its Dual University Master's in Digital Manufacturing. This two-year master's degree is intended to address the needs of firms within the framework of Industry 4.0. The course is presented at various training and research centres (IMH, CFAA Zamudio, IK4 IDEKO, Tecnalia and Vicomtech). It also applies 'learning by doing' methodologies, which combine theory with case studies and with the development of prototypes or other types of practical exercises, the aim being to apply theory to reality and make the classes more dynamic.

These cases are characterised by their use of innovative methods based on acquiring skills through challenges, specific case studies and the reality of business the students will potentially face. In this regard, they highlight the importance of learning to learn in the emerging new economic model. It is necessary to teach students to continue educating themselves. In any event, alternance models should not be idealised. In addition to being more demanding in terms of management and organisation (for business, educational establishment and students), they must be adapted to the studies being undertaken, the types of business and the backgrounds sought, and even the nature of the educational institutions involved. Although alternance training make it possible to contrast theoretical and practical knowledge, they may also tend to produce overspecialised students, thus generating a sort of 'tunnel vision'.

In order to implement dual university education offerings, they must tackle major challenges. Firstly, it is essential to underline the complexity that results from having to coordinate the larger number of stakeholders involved. Secondly, this complexity translates into a greater need for resources and the resulting cost in comparison with more traditional education. Individual tracking with students (by tutors/mentors at both the educational establishment and the work site) often reduces the enrolment capacity of these institutions. Consequently, this is giv-

ing rise to new university financing schemes. The cost is also increased by the fact that, unlike vocational education and training, dual university education is not yet regulated, so that students can have employment contracts when it comes to doing placements at other organisations. Furthermore, another source of difficulty lies in the changing roles of the parties involved, which in turn requires a set of capabilities which do not always exist and need to be developed. This is the case on both the business side, through, for example, the role of mentor, and among the university team.

Another of the paths highlighted by the 2019–2022 USP involves strengthening alumni networks. These are networks made up of former students who, with the support of educational institutions, can provide benefits for recent graduates and alumni. In addition to offering support in seeking employment and organising activities which make it possible to maintain ties among and with alumni, alumni networks are one of the tools available to schools which contribute to their students' lifelong learning and collaborate with firms and other entities. What is more, although they provide little to no financial return, these networks can lend a key competitive advantage in comparison with other schools. Business schools, for example, have a long tradition of developing such networks, due to the sector of activity on which they are focused.

One of the formats with the greatest success when it comes to motivating alumni participation and contributing to their continuous learning at the university are courses, seminars and workshops offered by the alumni networks. They are shorter in duration, which makes it possible to develop new skills with greater flexibility. This is an alternative to official qualifications which involve long and complex official recognition processes and can hinder the motivation to participate among alumni who have already entered the labour market. Additionally, these shorter formats can act as gateways to undergraduate and postgraduate educational offerings. There are experiences in alumni networks which include alumni participation as teachers. The proposal of this type of training may even come from the alumni, demonstrating that this is a highly valid mechanism for connecting with the business world. Furthermore, these networks make it possible to identify the occupations of alumni, who can participate, by means of informal and formal spaces, in defining the content of the educational offerings at universities, thus bringing their experience into the classroom.

The alumni networks can contribute greater flexibility to the university training on offer, by shortening the distance between the demand for skills in the labour market to the university

4.4 Vocational education and training in the education system

The description of skill formation systems provided in Subsection 4.1 showed that, within the EU as a whole, the Basque system is close to that of Spain. This is not surprising taking into account that a large part of the regulatory framework for this system (including the skill framework) is established at the national level. It is a system in which the VET subsystem clearly has greater weight than in liberal market economies (such as the United States or the United Kingdom), but somewhat less than in coordinated market economies (such as those found in the central and northern areas of the EU). And it is a subsystem based more on the school (as is common in VET systems in southern Europe), than on the firm (as is typical in countries such as Germany and Switzerland, where dual VET is most prevalent).

Basque VET has been a pioneer in Spain due to its singularity and higher level of development

However, although it may be classified within the same type as that assigned to the Spanish subsystem, a more detailed analysis shows that, within this, the Basque skill formation system has significant particular features, almost all of them favourable in nature. In order to identify these particular features, we performed two types of comparative analysis. One, when there are available data, the comparison is based on quantitative indicators. Two, when there are no quantitative data on Spain for the situation to be compared, the assessment is based on expert knowledge, supported by the evidence and specific data available for the Basque Country.

Table 15 was created in order to conduct a comparative analysis of the Spanish and Basque VET systems based on quantitative statistical data. From this it is possible to conclude that:

- Students enrolled in initial VET in the Basque Country represent approximately 5% of Spanish enrolment, a percentage which exceeds that of the Basque population aged 15–19 within the Spanish population (4.2%).
- The male proportion of VET students is higher in the Basque Country than in Spain as a whole (65% compared to 58%). In part, this figure is related to the greater share of industrial occupational categories in Basque VET offerings and the traditional view of industrial work as masculine. The Basque Country should promote the participation of women in VET studies, especially in industrial occupational categories.
- The share of private educational institutions (the majority state-subsidised) in the VET system is greater in the Basque Country than in Spain as a whole (45% compared to 26%, measured by number of students). This more balanced combination of public and private establishments gives the Basque system greater flexibility and ability to adapt to different circumstances.
- Together with Cataluña and Asturias, the Basque Country is among the Spanish autonomous communities with the highest relative share of higher VET students, a level which requires greater capabilities in terms of the teaching staff and equipment, and greater investment by the government educational body.
- Compared to Spanish VET, based heavily on occupational categories related to the service industry and cross-cutting qualifications, VET in the Basque Country includes a considerable presence of occupational categories linked to industry (more than 42% of students, compared to 25% in Spain). This indicates the commitment of the Basque Government to education and training linked to that economic sector, which in educational terms also requires more sophisticated and costly facilities and equipment.
- Completion rates for initial VET studies – and therefore, the effectiveness of the VET system – are clearly higher in the Basque Country than in Spain (70% compared to 60%).
- The relative share of Basque dual VET within Spain, in quantitative terms, is similar to that found in traditional VET. However, the uniqueness of Basque dual VET is somewhat masked by existing quantitative indicators, which are not able to capture its most strategic and nuclear aspects. Regardless, even with the quantitative indicators available, we find that Basque dual VET is heavily orientated towards higher VET levels (81% in the Basque Country, compared to 62% in Spain) and toward industrial occupational categories (73% compared to 37%).

TABLE 15 Main indicators for initial VET in the Basque Country and Spain (2016–17 academic year)

	Basque Country	Spain	% Basque Country / Spain
No. VET schools	182	3,721	4.9
% public VET schools	48.4	68.8	70.3
No. students	39,836	791,385	5.0
% male students	65.3	57.6	113.5
% students at public VET schools	55.0	74.2	74.1
% basic VET students	11.1	8.8	126.5
% intermediate VET students	36.2	43.5	83.4
% higher VET students	52.7	47.8	110.4
% students in industrial occupational categories	42.3	25.4	166.3
% students who finish studies	69.6	60.1	115.8
No. students in dual VET	996	20,357	4.9
% basic dual VET students	0.2	2.0	9.9
% intermediate dual VET students	19.0	36.5	52.0
% higher dual VET students	80.8	61.5	131.4
% dual VET students in industrial categories	72.7	36.5	199.1

Source: Ministry of Education and Vocational Training. Compiled by authors.

However, the available quantitative indicators of a comparative nature only convey a faint image of the true uniqueness and greater level of development found in the Basque VET system. There is a great deal of evidence, which cannot be measured using comparative quantitative indicators, to support this assessment:

- In relation to overall governance of the system, the Basque Country is the only Spanish autonomous community in which the government educational body has the rank of subdepartment. In all other autonomous communities, it is a directorate-general or merely an office. There are also two institutions which report to the subdepartment, IVAC (Basque Institute for Vocational Training Knowledge) and Tknika. These were created to promote the qualifications and VET system, and applied research and innovation, respectively, and there is nothing comparable in the other autonomous communities. This structure has enabled the Basque Country to be the autonomous community that has made the most progress on updating and adapting curriculums, and in support for applied research and innovation at schools.
- The Basque VET Council, in addition to playing a very active role in the system, stands out when compared to those in other autonomous communities for the presence of representatives from VET schools on the board. Among other things, this is enabling the notable and active involvement among Basque VET schools (virtually non-existent in other autonomous communities). In addition to fostering their representation, this allows them to exploit synergies and disseminate learning among members.
- The degree of involvement of Basque business associations in the development of VET is also a benchmark throughout Spain. This has been crucial to organising

the Basque VET system and defining its key pillars (in order to implement OJT, dual VET, quality certification for schools, etc.). Additionally, there are various examples of close collaboration between firms (often drivers) and nearby VET schools, as in the case of Petronor with the Somorrostro VET school.

- Following an international benchmarking exercise, in the 1990s, the Basque Country decided to adopt the combined school model found in the Netherlands, which combined teaching of initial VET with VET for employment (López-Guereñu, 2018a). In this regard, the Basque Country was the driving force for this school model in Spain, which was later recognised and made possible for the entire country with RD 1558/2005. Even today, of the 162 combined schools in Spain, 22 are based in the Basque Country (14%).¹⁶ These schools, in addition to engaging in a broader range of activities (see below), are characterised by a more autonomous and flexible organisation, operation and governance, and by societal and business stakeholders having a stronger presence in their governing bodies. Even without limiting ourselves to combined schools, the Basque Country is the autonomous community which has achieved the highest degree of implementation for quality certification at VET institutions.
- Additionally, as a result of an international benchmarking exercise in which reference was made to Germany, the Basque Country was the first autonomous community in Spain to implement dual training programmes, in partnership with business associations (Mujika and Intxausti, 2018). Following RD 1529/2012, which established the dual VET format for all of Spain, dual VET was introduced in all autonomous communities. However, due to the ambiguity of the aforementioned royal decree, each autonomous community has implemented it in a different manner. In the Basque Country, the dual model chosen is characterised by being primarily school-based (so that the training provided is supplemented, rather than replaced, by that provided by business).¹⁷ This is due to the fact that it requires the student to be paid and the basis of their relationship with the firm must be an employment contract (or in exceptional cases, a grant), because it follows a combined alternance model (alternating between training periods at the school and at the firm), because a three-year specialisation was implemented (something which, until 2019, was almost solely limited to the Basque Country and Navarra in Spain), and due to the greater involvement of business associations in its implementation and operation (while in many other autonomous communities, it has been more a reflection of a quasi unilateral initiative of the central government).
- As a result of the combined school model, VET institutions in the Basque Country have played an important role in the supply side of VET for employment (especially in that linked to industrial categories), while in the rest of Spain, VET institutions have been virtually absent from VET for employment. And likewise,

Basque VET has been a pioneer in Spain in multiple areas: combined school model, implementation of dual, specialisation programmes, etc.

¹⁶ There is quite a large group of private VET schools in the Basque Country which, on the basis of the 14 March 2017 Order of the Basque Departments of Employment and Education (which establishes the procedure for their authorisation as combined schools), have requested recognition as such. However, the Basque Government (BG) has not yet issued the corresponding resolution.

¹⁷ In Germany, the initial reference country for dual VET, it is based more on the business side. This can be explained, among other things, by the greater size and capabilities of German businesses, and the culture of engaging in this type of activity. In the Basque Country, which has much smaller firms and much more qualified and better equipped VET institutions than in Germany, it is more natural for the process to be led by the schools. What is more, according to Poulsen and Eberhard (2016), insofar as dual VET is presented at higher education levels and the aim is to develop more general skills, which enable progress at later stages, the school-based model is preferable.

although RD 1558/2005 also provided for combined VET schools carrying out R&D&I projects and providing business services, as indicated by Navarro (2018b), such development is currently quite anecdotal in the majority of the Spanish autonomous communities, with the Basque Country being the main exception. In this area, during the 2017–18 academic year, the schools that are part of Tkgune carried out 427 technical innovation and improvement projects at 360 firms (Navarro, 2018b; Tknika, 2019).

- Within Spain, the Basque Country is also a significant leader in the development of challenge-based collaborative learning, for which Tknika has developed the Ethazi programme. According to Tknika's 2018 annual report, the Ethazi programme has been used by close to 7,000 students and involved almost 2,000 teachers.
- VET in the Basque Country has also given considerable priority to the development of entrepreneurship, with specific programmes to develop both an entrepreneurial culture (Ikasenpresa) and business start-ups (Urratsbat). The results of the latter have no comparison in any other Spanish autonomous community: 815 firms were created between 2005 and 2018, of which 70% remain in operation (Tknika, 2019). However, of the firms created, the percentages operating in the industrial sector, or which have grown substantially since their establishment, are low.
- The Basque Country is also the only Spanish autonomous community in which, beyond organising gateways to facilitate graduates from higher VET going on to university, VET schools have begun to establish partnerships with the university and have jointly designing engineering programmes (see Box 8).
- Lastly, Basque VET is also unique for its degree of internationalisation, which extends beyond language teaching or student and teacher exchanges to participation in EU training and consultancy programmes offered to VET schools and governments of other countries, and it participates and is involved in various international networks (see Tknika, 2019).

For all of these reasons, the Basque VET system (with the recent Basque VET Act and the 5th Basque VET Plan, which represent notable milestones) has attracted the attention of European authorities, who are looking at this experience in developing the European VET Excellence Initiative, which currently sets the agenda for Europe.

Having highlighted how pioneering Basque VET has been, we will now focus on some of the challenges which must still be tackled.

The first is to continue the struggle to lead society to view VET not as a pathway leading to lower level education and learning, but as a pathway with education and learning of a different type. In methodological terms, VET is presenting more advanced methods of learning than those at the university, breaking down functioning within silos of departments and disciplines, and better integrating applied and practical learning. However, in order to achieve the highest level of learning, so that Basque VET schools can become, like in Germany, 'universities of applied science', the issue of VET schools and teaching staff being governed by secondary school regulations must be resolved, as these do not offer the most suitable structures and incentives for these efforts.

There is still the perception that VET is second tier learning when in reality it is a different way of learning

Secondly, VET has a much faster speed of change than the university. But even so, its transformation requires a great deal of time (for example, the shift to presenting vocational education and training for employment, VETE, or providing technical services for SMEs). Although it may be stated that Basque VET schools are the most advanced in Spain, the degree of progress among them is not uniform. Thus, of the more than 180 schools that present VET courses in the Basque Country, those that offer dual VET represent approximately half, those that present VETE courses fewer still (approximately 40%), those that provide technical services for firms number fewer than 40 (20%), and those that have truly significant turnover add up to a dozen (less than 10%). Fortunately, through Tknika and school associations, these 'spearheads' are connected to the other schools that are not moving forward at the same pace, producing a transfer of knowledge and experience, so that no one gets left behind.

Progress towards a service-based and urban economy poses serious challenges for the Basque VET system

This uneven progress in VET is also reflected in the territory. Unlike the university, VET is, more than anything else, a local institution, closely linked to its county (from which the majority of its students come and where they also carry out the majority of their work placements and join the labour market). VET is highly developed in Gipuzkoa, where all the counties are well covered and the schools are very dynamic; but less so in Bizkaia (where there are counties with a very weak school presence) and in Alava (where they are very scarce outside the capital). It is necessary for planning around VETE courses and activities to take the situation at the county level more into account. What is more, except for a few exceptions (e.g., Goierri and Lea-Artibai), VET schools have not been key stakeholders in design and implementation of local development strategies, although this issue is being corrected, especially in Gipuzkoa.

The Basque VET system has developed its greatest strengths within the sphere of the most industrial occupational categories and counties, thus reinforcing industrial competitiveness. But the majority of future economic activity will be linked to the world of advanced services and the cities. It is necessary to explore how Basque schools should tackle these new realities, by means of projects such as the one currently being backed by Bilbao Ekintza (see Box 3).

The demographic challenge requires policies to attract women and foreign students

Lastly, VET schools are facing a demographic challenge. One, a serious problem of population replacement among their teaching staff, with no firm plans yet in place to deal with this. Two, the problem of a decline in the cohorts of young people entering VET studies. In response to such great anticipated growth in demand for people with a VET background, the Basque Country must attract more women to this type of studies, as well as returning to initiatives such as those launched in the first five years of the century to attract young people to undertake – or complete – their VET studies in the Basque Country, and then try to get them to remain afterwards. Formulas such as dual VET and three-year specialisation courses offer better conditions for this than were found at that time.

BOX 9 Supply-side VET for employment

Unlike initial VET, which is intended primarily for young people before they enter the labour market, VET for employment (VETE) is intended for workers, whether employed or unemployed. In VETE it is common to distinguish between that offered by the government and that organised by employers. The latter is specifically discussed in Subsection 4.5, and we only have detailed data for that which is incentivised by the State Foundation for Training in Employment (Fundae). Even with this restriction, we find that by number of workers participating in training activities, this format easily surpasses supply-side VETE (224,000 compared to 48,000, in 2017). But the credit used by firms for incentivised training (28.4 million euros in 2018) is considerably less than the subsidy for supply-side VET (45.5 million euros in 2017). This is explained by the fact that one, the incentive does not cover the entire cost of training activities given by the firms, and two, their shorter average duration (generally not based on certificates).

Within supply-side VET, although more people have completed training for the employed than for the unemployed (31,000 versus 17,000, in 2017), the budget allocated to the former is smaller than to the latter (11.3 million euros compared to 34 million) (see Table 16). The coverage rate is also higher for the unemployed. In the case of the Basque Country (19% compared to 5% in Spain), this is explained by both the greater resources the Basque Country allocates to this policy and its lower unemployment rate. Even so, in comparison with other autonomous communities, the Basque Country gives more weight to VETE for the employed.

Courses for the unemployed are usually longer and linked to obtaining professional certificates, as the unemployed generally lack qualifications and need some accreditation to effectively enter the labour market. This problem is heightened by the decline in the number of unemployed, as those left include the least qualified. For this reason, courses with the lowest skill level (levels 0 and 1) have been gaining a larger share of VETE for the unemployed; while higher level courses are more prevalent among the employed.

More than 22% of students follow courses for industrial occupational categories (mechanical manufacturing, electricity and electronics, etc.), while in Spain, these categories only account for 16%.

VETE offerings in the Basque Country are also distinguished from those presented in other autonomous communities for the significant share provided by VET institutions. While in many other Spanish autonomous communities, it was societal stakeholders that, in addition to being involved in the distribution of funds, played an important part in presenting the courses, in the Basque Country it was decided to give priority to VET institutions, especially for industrial occupational categories, which require a significant amount of equipment. Their involvement is also greater in VETE for the unemployed (which given its duration and other characteristics bears a closer resemblance to initial VET) than for the employed (which is more similar to that organised by employers). This involvement of educational institutions in VETE, in addition to making it possible to provide better and more efficient training, enables the schools to improve their capabilities, and ultimately, initial VET itself.

The participation of state schools in VETE is made possible by *encomiendas*, or closed invitations to tender, while private VET institutions participate in regular invitations to tender. In addition to continuing with the newly established multi-year invitations to tender, it would be advisable to establish longer-term stable situations, reaching agreements with schools of proven excellence that will make it possible to invest in and create skills in strategic areas for the Basque Country.

TABLE 16 VETE indicators for the unemployed and employed in the Basque Country (carried out in 2017)

	For unemployed	For employed
No. training activities	1,429	2,981
No. training establishments	180	79
% public educational establishments	27	52
% private educational establishments	21	11
Participants who finish studies	17,080	31,143
% of women	44	48
% those who start	81	80
% of coverage	16	3
% in skill levels 0–1	40	4
% in skill level 2	48	78
% in skill level 3	12	18
% in professional certificate specialties	60	19
% in industrial occupational categories	22	23
% in sociocultural services, administration and business	24	32
% in other non-industrial categories	30	31
% in further training	24	14
% at public educational establishments	8	1
% at private educational establishments	20	2
Budget (thousand €)	34,132	11,385
Budget per participant (thousand €)	1,998	366
Participants per training activity	12	9

Source: Lanbide

4.5 The role of business in skill provision systems

Although business has traditionally been a key stakeholder in the skill provision system, its role has taken on growing importance in recent decades, principally due to two phenomena.

- The first is the spread of the educational approach based on learning outcomes and qualifications frameworks (see Box 5). With the participation of the main stakeholders in the skills system, including business, this approach strives for training and education more in line with the needs of the labour market.
- The second is the pace of changes taking place in the labour market as a result of technological advances and the social and economic transformations associated with globalisation. These are leading to an increasing instability in the skills required for employment (or growing skills instability)¹⁸ and require their constant updating (see Subsection 3.2.3).

¹⁸ According to the World Economic Forum (2018), by 2022 the skills required to perform most jobs will have changed significantly, meaning that, by that time, no less than 54% of people in work will need training in order to update and/or supplement their skills.

The role of business in skills development is increasing

In this context, a range of academic and institutional sources underline the importance of the firm as a stakeholder and place of learning ('company as a learning venue', Bahl and Dietzen, 2019). Stakeholder, because it provides a good part of the training for workers; and venue, because certain organisational aspects of the firm can foster both learning and the application of skills by employees. In this regard, when the firms in a territory do not require their employees to have high skills or underutilise their capabilities, this can produce what is known in the literature as a 'low skills equilibrium' (Finegold and Soskice, 1988). In other words, situations in which the economy is trapped in a vicious circle of low-added-value activities, dominated by low-skilled and low-paying occupations (a situation exemplified by the United Kingdom). In such contexts, overcoming the problem does not entail policies to improve the provision of worker skills, but industrial policies that seek to affect business strategies and behaviours, so that they shift to demanding and using greater skills from the labour force. In response to this, the main message to those responsible for designing policy is that, no matter how high the quality of a country's education and training system is, it will continue to be an inadequate skills system if the work environment is neglected (Green, 2013). For this reason, promoting work-based learning (WBL) has become a very strong element of policies around the provision of skills.

Although there is a wide range of ideas, practices and approaches around WBL, Bahl and Dietzen (2019) point out a limited number of common elements, among them:

- WBL means learning *for* work, *at* work and *through* work.
- Its aim is to develop professional, social and personal skills.
- The nature of WBL may be formal, non-formal or informal, and it commonly consists in a combination of all of the above.¹⁹

It is necessary to learn *for* work, *at* work and *through* work

When dealing with WBL, it is important to bear in mind that the nature of strategic decisions, power relationships and labour relations are key to understanding the opportunities and barriers to its development that emerge (Rainbird *et al.*, 2004). A firm's main aim is not learning, but rather this derives from the need to fulfil the aims of providing products and services in a competitive environment (Keep and Mayhew, 1999). This fact reflects the reality of training at many firms, especially smaller ones, as they do not have the capability to put together medium- and/or long-term strategies, and so may subordinate training activity to day-to-day needs, considerably limiting their potential.

It may be stated that WBL addresses two business needs linked to the challenges presented in the framework for this section. One, it helps adapt the skills of young people to the requirements of firms, facilitating their access to employ-

¹⁹ From UNESCO (2013: 13–14) we obtain the following definitions of formal, non-formal and informal education: Formal education is the result of institutionalised, intentional and planned learning processes, whose results are recognised. Non-formal education is the result of activities organised inside and outside the job, and presupposes intentionality by the student, although such activities are not usually explicitly designated as training programmes, nor are they usually recognised. Lastly, informal learning is not institutionalised and takes place in the home, workplace or as part of daily life, although it may be intentional or deliberate. UNESCO distinguishes such informal learning from incidental or random learning, which may occur as a by-product of activities that are not designed for the purpose of producing learning (e.g., watching a television programme).

ment. Two, it allows workers to continue developing their skills, in an exercise on ongoing adaptation to the changing needs of the labour market. This is a particularly important issue for school-based and heavily regulated training and education systems, as is the case of the Spanish system.

4.5.1 WBL for integration into the labour market: work placement programmes

High youth unemployment rates in Europe in recent decades have forced institutions to develop initiatives to improve work integration for young people. As a result, work placement programmes²⁰ have virtually become a youth employment policy in themselves. In Spain, the 1990 Organic Act on General Organisation of the Education System (LOGSE) incorporated on-the-job training (OJT), a training module involving in-company learning, as a requirement for obtaining a qualification in any VET course. However, unlike other European countries, until late 2012, with RD 1529/2012, a suitable employment contract was not developed for the training and learning, nor were the foundations of dual vocational education and training established.

The situation in the Basque Country followed a different path, characterised by greater involvement of the Basque Government and firms themselves in development of this WBL format from the early years of implementation of the OJT module. This relationship between tutors at the school and instructors at the firm has facilitated the adaptation of training programmes and joint design of new initiatives with which to address the demands of firms, such as specialisation programmes and dual programmes, which were pioneering in this country (López-Guereñu, 2018b).

4.5.2 WBL for workers

The main source for studying training organised by employers for their workers are the data published by the State Foundation for Training in Employment (Fundae) on incentivised employer training programmes charged to the compulsory Social Security contributions previously made by firms for that purpose.²¹ These data do not therefore include other types of training that firms may have provided: either because they are not eligible for incentives (for example, the informal training that employers provide for their workers) or because, even if eligible, firms have chosen not to request the incentive (generally, due to how onerous the process can be). Therefore, from the data contained in Table 17 it is possible to conclude that:

- The coverage rate for firms engaged in training (that is, the percentage of firms that are eligible for training incentives and receive them for having organised training activities), although higher than in Spain, is still low: 26% if all firms are

²⁰ Within the European sphere there are a range of WBL schemes related to work integration, or work placement programmes: a) alternance schemes or apprenticeships, known as dual programmes; b) school-based vocational education and training, which requires on-the-job training periods; and c) WBL that is integrated into school-based programmes, through labs, workshops or simulations in real environments (European Commission, 2013).

²¹ As seen in Table 17, the percentage of Basque firms that provide training for their employees is quite a bit higher than the EU average, and somewhat more than in Spain. As noted, the reason may be the legal obligation in Spain to make contributions for training. Another matter is the effectiveness or focus training activities may have from one country to another.

The Basque Country has been ahead of the rest of Spain in introducing work placements and dual VET

considered, and 60% if microenterprises are excluded. There is therefore a significant percentage of firms (especially small ones) that, although they are eligible for incentives for their training expenses, do not offer training. Measures must be established to: one, facilitate administrative procedures with Fundae, in order to achieve a better rate of return for the Basque Country; and two, group together the needs of small enterprises by means of intermediary stakeholders (cluster associations, local development agencies, VET schools, etc.) and organise courses that adapt to their needs and the credits they have accrued to present training.

- Not only do the allocated credits fall short of those eligible for incentives, but also, of those that are allocated, Basque firms leave more than one third unused.
- The coverage rate for private-sector employees trained is 35% in the Basque Country, a little higher than in Spain (34%).
- Of the employees that benefit from training, 56% are men and 44% are women (with the coverage rate also being a little higher for the first group, 37%, than for the second, 33%).
- Of all Basque workers who participated in training activities, 24% had a primary education, 30% secondary, and 45% tertiary. In Spain, these percentages are 31%, 24% and 39%, respectively. That is to say, quite a bit higher for primary and lower for tertiary. From a quick glance of the data, one might think that in the Basque Country, training is overly concentrated among workers with a higher level of education. This would be logical from a purely business perspective or in terms of efficient use of resources, although not in terms of inclusivity and attention to the groups most in need of training. But in response to this conclusion, it should be considered that out of the entire Basque population in work, 22% have a primary education, 22% secondary and 55% tertiary (compared to 33%, 24% and 43%, respectively, in Spain). Therefore, comparatively, Basque workers with a tertiary education are participating in training activities in a percentage ten points lower than their share of the Basque population in work (while their Spanish counterparts only report four points less). The stratum which, proportionally to its share, is participating in incentivised training activities to a greater extent is that with a secondary education.
- Although trend-wise, we see growth in the e-learning format, in-person training is still the format that attracts the most participants. Additionally, the percentage is somewhat higher in the Basque Country than in Spain (79.4% compared to 75.5%).
- Training activities are considerably concentrated in the management and administration (25%), safety and environment (25 %), sociocultural and community services (14%) and further training (10%) categories. All of those encompassed within the industrial categories do not even strictly total 10%. This indicates that training is not directed at reinforcing what would be the unique skills of firms. As the CES (2015) recommends for Spanish incentivised training, it would be advisable to diversify the activities and increase the share of those within occupational categories linked to sectors and priorities established for the productive fabric.

Workers with secondary studies benefit the most from training activities organised by employers and incentivised by Fundae, although rarely in strategic areas

TABLE 17 Indicators for incentivised training organised by employers (2018)

		Spain	Basque Country
Coverage rate of firms engaged in training		21.2	25.9
Coverage rate of firms engaged in training (> 10 emp.)		54.5	59.7
Incentivised training credit used		535.6	28.4
Credit used of allocated		65.8	63.0
No. employees trained		4,413.9	223.9
Coverage rate of employee training		33.7	34.9
Percentual distribution of participating workers and incentivised training	Women trained	44.3	43.7
	Men trained	55.7	56.3
	Trained persons aged 16–25	5.5	4.4
	Trained persons aged 26–45	58.2	56.1
	Trained persons aged 46 and over	36.2	39.5
	Microenterprise	8.4	8.7
	Small	14.7	20.9
	Medium	20.9	31.3
	Large	55.9	39.1
	Agriculture	1.1	0.3
	Industry	18.9	28.2
	Construction	5.4	5.2
	Business	14.5	9.9
	Hospitality	7.1	4.8
	Other Services	52.9	51.6
	Primary education	31.1	23.8
	Secondary education	28.7	30.3
	Tertiary education	39.3	45.3
	In-person	75.5	79.4
	Mixed	1.0	1.1
	E-learning	23.5	19.5
	Management and administration	27.7	25.0
	Business and marketing	8.6	5.9
	IT and communications	6.7	6.3
	Safety and environment	21.6	24.8
	Sociocultural and community services	8.4	13.5
	Further training and education	9.7	10.1
	Other cross-cutting or services classifications	5.9	4.7
	Industrial occupational categories	11.3	9.7

Source: Fundae and INE (National Statistics Institute).

Training at SMEs requires financial incentives, favourable regulatory frameworks, intermediary organisations and support for instructors

4.5.3 Measures for improving WBL

Numerous publications include recommendations for stimulating WBL and improving apprenticeship programmes. Generally, emphasis is placed on SMEs. This is because, as the data show, due to their smaller amount of staff, more limited resources and a lack of familiarity with the regulatory and administrative framework, they encounter greater difficulty in participating in in-house apprenticeship programmes.

Although apprentice training programmes represent an interesting path to hiring personnel with the skills required by the firm, they also require an investment (both economic and organisational) which holds the smallest enterprises back. These are frequently fearful that after their efforts, the trained apprentice will take a position with a larger firm, and generally, with better employment conditions.

The recommendations for strengthening WBL at SMEs centre on three areas. Firstly, different types of financial incentives (fiscal, subsidies or grant programmes) could be implemented to reduce the cost to the firm. The second area is related to the environment, with the establishment of a regulatory framework that clarifies the responsibilities, rights and obligations of each party, or the creation of a network of intermediary organisations. This would offer SMEs the proper expertise and information, as well as the necessary support to define and organise the practical experiences at firms which should form part of a training programme jointly defined with the training establishment. Lastly, it is key to support what are known as in-house instructors or internal trainers, with the creation of guides and specific training to facilitate their activity.

In the case of the Basque Country, there are several grant programmes to drive work placements for young qualification holders: Global Training Grants from the Basque Department of Economic Development, the BBK Foundation and the Novia Salcedo Foundation, etc. Intermediary organisations perform the support work of managing these grants (VET schools and school associations, employers' organisations, trade unions, etc.).

As regards OJT and dual VET programmes under an alternance scheme for students, the role of the Basque Business Confederation (Confebask) and the VET schools themselves has been very important for informing, guiding and supporting firms. As for fiscal measures that promote work placement programmes, especially at SMEs, it would be worthwhile to incorporate incentives directly related to WBL programmes into the provincial regulations governing the business tax, such as a 10% deduction for expenses incurred by the firm in hiring dual VET students (Confebask, 2017).

With regard to data on WBL, it is important to mention that Fundae, the In-House Vocational Education and Training for Employment Survey, and the sources of information at the Basque Country level (Lanbide and Eustat) do not include the informal learning that takes place at firms in their statistics. However, this constitutes an important part of what people learn in the workplace, especially at SMEs (Cedefop, 2015a, 2015b; ILO, 2008). Through informal learning, individuals not only acquire practical skills and abilities in the workplace, but they also become socialised in the working environment and develop their professional identity. Nor do the main European data sources include the three forms of learning,²² or measure their components in the same way. This makes comparison and obtaining comprehensive information about the European WBL system difficult. Improving systems for obtaining data about WBL is important for designing effective policies that improve the skills systems. For example, incorporating qualitative analyses would contribute to a bet-

There is a lack of information and policies around informal learning within firms

²² The CVTS (Continuing Vocational Training Survey) includes formal and non-formal learning initiatives. The EWCS (European Working Conditions Survey) defines on-the-job training as training given by co-workers at the firm, setting aside training offered by stakeholders outside the firm, such as courses, etc. And the AES (Adult Education Survey) refers only to non-formal learning, without providing information about formal and informal.

Workspaces and the interactions they house must shape themselves into places of learning

ter understanding of the reasons behind lower investment by SMEs in formal and non-formal learning. The inability to perform training needs assessments, and the reluctance of employers at small enterprises to facilitate formal acquisition of skills among their employees, especially that which involves some form of qualification, for fear that they will leave the firm, are reasons given in some studies (ILO, 2008).

Lastly, considering the firm to be a learning venue makes it necessary to deal with the fact that some (perhaps many) work spaces are not configured in the best possible way to benefit from the programmes or get the highest yield out of their employees' learning potential (Fuller and Unwin, 2019). It is important to help firms, especially small ones, to reflect on their own ability to create and manage suitable environments for the optimal use and development of skills, taking into account factors of organisation, society and agency which interact within this dynamic environment (Rainbird *et al.*, 2004).

The dynamism of the workplace as the environment in which learning can take place is influenced by how workers interact with the manner in which work is organised and managed; the nature of contracts, which may include incentives or specific remuneration schemes for learning; the level of autonomy which employees themselves have to determine how they do their work; and to what point employees are involved in decision-making at the firm (Unwin, 2017). Thus, the specific organisational aspects which have an impact on promoting learning include: defining employment positions, which incorporate or do not incorporate non-routine tasks; job rotation practices, giving access to different sections and departments within the firm and encouraging interaction with other members; teamwork in which all members can contribute and feel involved in decisions; the possibilities of access to learning by everyone in the organisation (not being limited to certain categories) and a wide range of knowledge (including theoretical knowledge); promoting effective internal communication and setting up informal spaces for networking which contribute to the exchange of information and experiences among people within the organisation.

5

Conclusions and recommendations: is the skills system the panacea?

The skill formation system is a necessary and key part of a territory's competitiveness and wellbeing, but it is not enough to attain both: it is not a panacea. The investment made by society, in general, and the various stakeholders, in particular, in improving the level of education and training – even if we suppose that this has been done effectively and has led to an increase in individual qualifications and skills – will not bear the right fruit if, by not providing sufficiently complex employment positions which require their deployment and use, firms do not take advantage of them. In other words, it is not enough to take action on the supply side, training and education, it is also necessary to take action on the demand side. And for this, industrial and technological policy is key.

It is not enough to take action on the supply side of skills formation; demand is also key

What is more, the literature shows that education and training policy and industrial policy are subsystems which, in order to function optimally, must maintain a tone that is consistent with other spheres or subsystems in society (among them, regulation of the labour market, the welfare state and social protection, and industrial relations). There is no one optimal variety of capitalism, but in economies which contain somewhat inconsistent combinations of systems, such as mixed market economies (in which we may include Spain), their economic and social performance may be hampered. Two key lessons may be taken from the foregoing. One, although necessary and key, it is not possible to base competitiveness and wellbeing on the simple improvement and preparation of people in work. Rather, education and training policies, although key components of a competitiveness policy, must be accompanied by – and closely interrelated with – industrial and technology policies. Two, the different policies and government departments must operate in a coordinated manner, making it necessary to have a country-wide strategy which lends meaning and consistency to the efforts each one undertakes.

The literature dealing with the consistency of the different systems was initially developed taking the framework of the states as a point of reference. However, it was later demonstrated that there are significant differences in the way in which the different systems, both geographic and sector-specific, operate. The industrial and competitiveness policy applied by the Basque Country, for example, has been truly unique (e.g., in its pioneering implementation of a cluster policy). Moreover, as regards the supply side of the skills system, its commitment to developing a VET scheme in line with its industrial policy, and the model of a multi-

Some key elements of the system are national, but there is margin for action for regional strategies and policies

functional VET centre, has become a benchmark for the European VET Excellence Initiative, backed by the European Commission. Even so, within the framework of the states, regional policies have some room for manoeuvre, which should be exploited. It is not necessary to point out that, also on the regional plane, policies should strive for that consistency and complementarity, and be designed according to a strategy that acts as the glue which lends them this consistency. Furthermore, the report highlights the role of the subregional plane, where the trends and developments set out here have an uneven impact, and proximity fosters dialogue among stakeholders to adapt the supply and demand of skills.

5.1 Seeking a shared approach

Beginning in the 1980s, training and education systems began to organise themselves not according to theoretical curriculums (input-based approach) but around learning outcomes or skills (outcome-based approach). Studies have shown that competitiveness appears to be more closely related to the skills possessed than the education levels achieved (OECD, 2012; CES, 2015). The problem lies in the fact that there is no consensus around what is understood by skill and what components comprise a skill. Furthermore, nor is there a consensus around what it is called among the different disciplines of knowledge, international organisations and authors. Seeking a common foundation among all these approaches, in this report, the term 'skill' is understood to refer to those personal characteristics which enable people to generate value by carrying out tasks, and which are not innate, but which can be augmented by means of learning.

The economics approach makes it possible to assess the contribution that skills (or 'human capital') make to productivity and economic growth. From this perspective, the report shows that in the Basque Country, the contribution made by improvements in the labour input to growth of the apparent productivity of labour has been declining, and was relatively small during the 2013–2018 period. Among positive aspects, we can highlight that the contribution made by physical capital rests largely in ICT capital, and that, although part of the global trends towards a slowdown – and even stagnation in some economies – in total factor productivity (TFP), the Basque Country is reporting results somewhat above those of the countries used for comparison in this indicator, which measures the degree of progress in innovation.

For their part, educators/educationalists are unravelling the components and typologies of skills. Unless we have appropriate and shared frameworks to structure and analyse the content and components of skills, it is impossible not only to know and identify what types of specific learning should be promoted, but also to make comparisons with other places and have the necessary interaction among stakeholders in the business and education worlds.

In this regard, the report demonstrates that the Basque Country made a wise and pioneering commitment to developing an integrated skills system in the 1990s, which has produced the current Basque Framework of Vocational Qualifications and Specialisations, and which created the Basque Institute of Vocational Training Qualifications in 1998. However, this culture of working with mutually agreed skills frameworks has not extended far enough into spheres outside the world

The Basque Country was a pioneer in introducing integrated qualifications systems

of education. In addition to this, some of the attempts at assessing the skills and professional profiles necessary for the future have been carried out in these business spheres without the collaboration, initially, of other types of stakeholders, and without a combination of analysts from different disciplines. The result is that these laudable attempts, in addition to being difficult to compare with similar exercises carried out by international organisations such as the OECD, may require significant effort to adapt and transfer them to education and training programmes. There is also a need to strengthen the forums and spaces where different types of stakeholders are present, and those which incorporate contributions from experts in different disciplines, making it possible to identify and organise responses to the challenges facing the training and education system as a whole concerning skills and professional profiles (and linked to them, skill sets and qualifications).

5.2 The mismatches that affect the Basque Country

Among the many types of mismatches identified in the literature, the report has highlighted and delved into three that are considered particularly relevant to the Basque Country.

The first major mismatch found in the international literature on skills is overqualification. For the literature, this is one of the most significant problems in practice, yet one to which governments usually pay less attention. In the case of the Basque Country, the overqualification indicator, calculated by Orkestra for all European regions, shows that it is the European region with the highest value in that index. It is a phenomenon that we should not ignore due to the economic and social cost that it generates, from three different points of view: personal (lower salaries, lower work satisfaction), business (greater labour rotation), or the system as a whole (unreturnable investment). As all experts point out, the solution to this problem does not lie in introducing the *numerus clausus*, and even reorganising vocational guidance policies offers limited results. The main means of correcting this imbalance involves increasing the share of highly skilled occupations in the Basque productive structure. As Tether *et al.* assert (2005), in response to this type of situation, the demand for skills by business must be corrected (which requires suitable industrial and technology policies), as well as increasing the capabilities of the management teams.

The second major mismatch usually mentioned in the literature is skills shortage, generally measured as the percentage of vacancies for skilled workers which firms are unable to fill. However, as organisations such as the Organisation for Economic Co-operation and Development (OECD) and the International Labour Organization (ILO) warn, that inability is likely due to the lack of people with such qualifications in the marketplace, and not because firms are not willing to offer the pay or provide the working conditions that are appropriate for such workers. When this second opinion is introduced, the OECD (2011) concludes that there is not generally evidence of this type of shortage. And McGuinness *et al.* (2017) go even further, maintaining that this is one of the imbalances for which the least real evidence exists. What studies are available on such unfilled vacancies for the Basque Country fall prey to the same mistake: their measurements do not include firms' readiness to deal with this greater pay or working conditions. There-

The most significant skills mismatch in the Basque Country is overqualification

There is a lack of evidence to be able to state that there is a real skills shortage in the Basque Country

Firms must deal themselves with the shortage of specific skills

fore, according to the theory, they are not actually measuring the real lack of skills that exists.

It is common to hear firms say that certain technical skills they require are not found in the marketplace. This often occurs because such skills are not of a general nature, but specific. In other words, they are the type of skills for which, because they are less transferable, economic theory maintains that it is those that are specifically interested in them (namely, the firm and the worker) who should be responsible for organising and financing them. As the WEF (2019) notes, in a world of such rapid change, it is firms, either individually or collectively (e.g., in cluster associations), that should engage in strategic planning processes, by means of which they identify what new skills needs they are going to require and ensure that they are attained. Certainly, insofar as they are not capable of identifying and carrying out such processes on their own, they should open them up to specialised training and education providers (VET schools or universities, among others). This philosophy is reflected in, for example specialisation programmes (or 'third year of dual VET'), in which the Basque Country was a pioneer in Spain. These generally emerge when an advanced firm identifies a need for certain skills that current qualification holders do not possess, and jointly develops a training programme with VET institutions (and in collaboration with the IVAC), which is presented at the educational institution and the firm.

The third major type of mismatch relates less to whether the total level of supply coincides with that of demand, but rather to whether the makeup of the former fits that of the latter. For this reason, this type of mismatch is known as 'horizontal' or 'field-of-study' mismatch. It occurs, among other reasons, because the educational offer made by VET schools, in addition to paying attention to the needs of the productive fabric, frequently base their planning on student demands and the interests and inertia of the institutions themselves, which are not always in line with the former. In comparison with other territories, the Basque system has developed quite advanced information mechanisms concerning demand for current qualification holders by the productive fabric (examples of which include the work integration surveys and other statistics provided by Lanbide). In any event, that entire information system on the needs of the production system relates to the current situation, and does not look forward to the future. Also, the assessment of the degree of match and resulting planning of training and education offerings are carried out by each training and education provider in isolation, without the involvement of the other stakeholders.

It is estimated that there will be a decrease in manufacturing and an increase in business services

In response to this, the report has analysed the sector-specific employment prospects up to 2030 and the degree of match between VET and university graduates and the demand deriving from these prospects²³. With regard to the first, it is possible to conclude that the Basque Country has good employment prospects up to 2030: growth is expected to be clearly higher than that in the EU, although lower than in Spain. However, manufacturing will lose share, both absolute (27,000 jobs) and relative (its share will drop to 4.2 percentage points of total employment). Even so, its relative share will still total 16%, several percentage points above what Spain and the EU-28 will have. In contrast, the main increase will

²³ The analysis of the mismatches between employment and training is part of the project that Orkestra is currently carrying out for the Department of Employment and Social Policies of the Basque Government.

come from business services, which, in addition to becoming the number one major sector of the Basque economy, will account for a larger share in the Basque Country than in Spain and the EU-28. In any event, the greatest employment opportunities (85%) will come from the need to replace almost half of the jobs existing in 2018. Within manufacturing, it is the most transformative and integrative (machinery and equipment and transport equipment) that have the most positive prospects.

Within those business services, although we already have the traditional technology centres, the most significant portion is made up of other types of highly knowledge-intensive organisations, but those where the basis is not normally R&D, but rather something else: engineering, IT services, consultancy, legal advisory, etc. At the current stage of competitive development, there are two trends operating simultaneously: one, the need to accompany technological innovation with non-technological, with the development of new business models, with servitisation processes, etc.; and two, the need to deploy open innovation processes, that is, in collaboration with other stakeholders, because with the growing complexity and diversity of the knowledge required to innovate, they cannot be contained within the firm alone, but must also make use of external knowledge (Chesbrough, 2003). This need for access to external knowledge is what is behind the increase in the share of the knowledge-intensive business services and, as Jensen *et al.* (2007) maintain, this sector has become a core and determining component of the level of development and dissemination of innovation in a given territory. Therefore, services now play the role that used to be played by machinery in transferring knowledge and technology and in articulating a country's economy.

Business services are necessary to combine open innovation and non-technological innovation

With regard to the degree of match between supply and demand of holders of VET and university qualifications, from the study conducted, it can be concluded that in the 2019–2030 period, the total number of holders of VET qualifications that will be demanded by the production system will coincide, in broad terms, with the number of qualification holders currently joining the labour market. In contrast to what is conveyed by current work integration rates (in which holders of qualifications in industrial occupational categories report higher rates than those in non-industrial occupational categories), the matching exercise carried out points to the possible existence of a certain overcoverage in the industrial occupational categories, and undercoverage in the non-industrial ones. This is related to the sector-specific employment prospects discussed above. As regards the university, the exercise points to undercoverage in excess of 30% for holders of university qualifications, with technical sciences and economic, legal and social sciences being those which will have the greatest shortfall.

This higher demand for people with one, an economic, legal and social sciences background, and two, technical sciences, is in line with the trend, mentioned a little earlier, towards the new, softer, skills required for business competitiveness (to develop new business models, servitisation processes, etc.), as well as the increasing prevalence of the services sector (and especially business services) in the Basque economy.

However, we must caution that the predictive exercise is based on extrapolation from current hiring trends. And if we really accept that in current hiring there is a considerable overqualification problem, it would be logical to think that this

should be corrected by increasing the share of intermediate skills (more closely linked to VET) and reducing that of higher skills (more linked to university). In fact, unlike the forecasts given for EU countries as a whole (in which the skills that experience the most growth are those of a higher level), Cedefop estimates that in Spain the occupations that will see the most growth are those at the intermediate level. And likewise, according to occupation estimates from Futurelan for the Basque Country (which are included in Subsection 3.3 of this topic document), whereas those with intermediate skills will experience significant growth between 2018 and 2030 (going from 46.7% to 51.7% in total), high-skilled occupations will decrease (from 33.9% to 32.2%).

5.3 Skills under the effect of global trends

The work and skills of the future will be heavily affected by both a number of major trends operating on a worldwide scale and the particular characteristics and circumstances of the Basque skills system. In relation to the major challenges or general trends which will impact the Basque Country in the upcoming decade, of the ten identified in the manifesto prepared by Orkestra in 2016, in the report we consider there to be four which will have a particular influence on future employment and the skills that will be necessary for that employment, and for this reason they are the object of specific analysis: ageing, digitisation, globalisation and climate change.

Aging,
digitalisation,
globalisation and
climate change
will impact future
employment and
skills

- **Ageing**, a particularly serious challenge in the Basque Country, will require measures to increase the labour force participation rate and employment for young people (e.g., dual training) and women (e.g., with real work-life balance policies), as well as not neglecting the training and education of people currently in the intermediate age cohorts (aged 35–50).
- On the effects of **digitisation**, the report confirms that the percentage of occupations with a high risk of automation is quite a bit higher in the Basque Country than the average for European regions. In any event, risk of automation does not necessarily mean job losses because, as the OECD (2019) notes, there is a great deal of scope for applying policies (training activities, fiscal measures, labour market reform, etc.) in this area. Furthermore, digitisation and technological change may be a trend which will in fact counteract the effects of ageing discussed above. To tackle the negative effects of digitisation, it is necessary to increase the sophistication of tasks in medium- and high-risk occupations, generating the individual skills for this, and facilitate transitions from higher-risk occupations to others with a lower risk of automation. This requires not only public policy, but also – as the WEF (2019) notes – that firms, on their own or cooperatively (in clusters), engage in strategic workforce planning.
- On the subject of **globalisation**, the report focuses on the relative qualifications of the immigrant population. This population has low education levels and is found in lower level occupations than the native population. However, there being such a marked overqualification problem in the Basque Country, it stands to reason that we should strengthen not general policies to attract people with a higher education level, but rather set specific types of talent as targets. Furthermore, it is necessary to have specific training and education processes which facilitate the adaptation of the skills and capabilities of the

immigrant population to suit the needs of the Basque productive and social fabric.

- References to **climate change** are usually linked to the source of employment which could be represented by the 'green economy', along value chains that historically have a strong position in the Basque Country, such as power grids, power electronics, renewable energies (solar and wind) and components for the automotive industry. There is also considerable growth potential in sectors such as electrical energy storage, energy efficiency and electric mobility. The transition to new modes of production, transport and mobility may generate job losses in economies closely linked to the automotive industry (FTI, 2018), as is the case of the Basque Country, if they do not quickly and appropriately tackle the challenges entailed by changes currently underway in technology and global markets.

However, in addition to the impact of these general trends or challenges on skills and future employment, the report deals with another set of trends which can be observed within the skills system itself. The Basque Country has negative prospects or unsatisfactory progress in two of them: in high-skill occupations and in the participation of the population aged 25–64 in learning activities. On the other hand, it is in a strong position in diversification of training activities and functions at VET institutions, in organising the system of supply at these institutions by skills, in increasing the permeability between and within education pathways, and in the hybridisation of the various skills acquisition systems.

The Basque Country is not making sufficient progress in learning among the population aged 25–64

5.4 Possible responses from the skill formation system

As stated earlier, the aforementioned trends operate through the specific characteristics of the skill formation systems in each place, while also influencing the transformation of these systems. Within the international typology of skills systems developed by Busemayer (2009), the Basque Country is characterised by a position with regard to the share of general education and VET which, although distant from the Anglo-Saxon model (where general education dominates), does not assign the same importance to the VET system as it has in the Central European countries. What is more, it has a relatively low (although growing) involvement of business in educating initial education students (that is, scant development of what is referred to as 'apprentice training'), and comparatively high involvement in continuing education processes, although they are more the result of regulatory imperatives than actual development strategies for their human resources, and thus more formal than strategic in nature.

The report analysed three major stakeholders in the provision of skills in the Basque Country: the university system, VET institutions, and firms, highlighting the main challenges or trends facing each of these.

- The Basque university system, although it still has room for improvement in the three main functions or missions that a university can perform, does have a combination of universities of a different nature (public and private), with different specialisations and strategies (some stronger in teaching, others in research and others in transfer and ties to the business sector), and a group of supporting stakeholders, intermediary stakeholders and science stakehol-

ders which complement them, creating a rich and diverse ecosystem. In recent years, it has implemented quite novel initiatives (e.g. the undergraduate degrees developed with advanced VET schools), as well as innovative adaptations to the Basque Country's smart specialisation strategy (such as, for example, the 4gune Cluster), which have the ability to make this system an international benchmark in both areas. In any event, the introduction of dual education in university programmes and promotion of programmes for learning following the initial education stage are challenges which the system must face looking ahead to adapting to the trends set out above.

The Basque VET system is pioneer in many fields and a benchmark within the EU

- From the comparative analysis, it is possible to discern the unique nature and much greater level of development of the Basque VET system. The report highlights a number of challenges that must be tackled if we wish to continue the positive transformation it has been undergoing since the early 1980s: promoting the image of VET not as a lesser path to education and learning, but different and an alternative to that of general education; preventing major differences in the pace of progress towards that 'excellence in VET' between some schools (and even territories) and others; combining a focus on and rooting in the county among VET schools with a supracounty scope of operation; paying more attention to the services sector, emerging activities and cities, without neglecting industry; and dealing with demographic decline and low numbers of women in VET.

The role of business in skill formation is becoming increasingly greater

- In the business environment, a number of changes and trends discussed earlier are leading to work-based learning (WBL) taking on increasingly more importance. The involvement of Basque business in initial education processes (e.g., apprentice training) is behind in comparison with the EU, although in terms of development, we are seeing progress in this area. And there is also margin for improvement in the training organised by employers for their workers: despite the possibility of receiving incentives for this, the percentage of firms that claim this incentive for having carried out training activities is low (26%), as is that of their employees covered by these activities (35%). Additionally, the training activities generally focus on categories and activities which are not core or linked to the strategic priorities of the territory. The report mentions three types of measures to reverse the situation: (i) implementation of financial incentives; (ii) promoting regulatory frameworks that clarify the responsibilities, rights and obligations of each party, and networks of intermediary organisations which help SMEs to overcome their inadequacies and group their needs; and (iii), support for in-house instructors and mentors.

5.5 Recommendations targeting public policy in the area of competitiveness

In the introduction to this report, we stressed the importance of working on resilience. This can be understood as the ability to withstand and adapt to changes caused by external factors (Martin, 2012), which may be of a variety of types, such as economic crises or changes in the structure of the regional economy. The analyses and conclusions in this report reflect that ageing, automation, globalisation and climate change are going to produce a structural change in employment and occupations in the Basque Country, which will have an impact on the qualifications and skills needs required by the productive fabric. If to this we add

the marked overqualification which the report has shown exists in the Basque Country and the internal trends in change identified in the skill formation system, there is no doubt that the Basque Country must boost its resilience.

To boost resilience, several authors (Boschma, 2015; Kakderi and Tasopoulou, 2017) propose public policy as a resource. Among these, we can distinguish between reactive policies which promote 'adaptation' to restore a balance (e.g., monetary policy), and proactive policies which promoting 'adaptability' and the generation of new paths, and diversification of the economic structure. The first are visible in the short term and necessary in response to emergencies and unexpected changes, whereas the second are policies aimed at generating conscious and necessary changes for the region in the medium and long term, and are those suitable for bringing about sustainable regional economic development. Although we recognise the importance of combining the two types of policies (for 'adaptation' and for 'adaptability') in certain situations, the Basque Country's resilience in the face of the challenges set out in this report entails a commitment to policies that promote adaptability.

Among the policies promoting adaptability, it is possible to make a distinction between horizontal framework policies (e.g., infrastructure; education; science, technology and innovation; clusters; internationalisation; jobs) and policies aimed at productive transformation (e.g., smart specialisation strategies, RIS3) (Magro and Valdaliso, 2019). Given the challenges of the skills system in the Basque Country, below we offer a number of policy recommendations to promote adaptability, with greater emphasis on competitiveness policies, as those relating to the spheres of education and employment have been specified throughout the report. Thus, in relation to horizontal framework policies, the main recommendations comprise:

- *Science, technology and innovation policies:* There is a trend of change in the Basque Country's structure of production towards an increase in the share of advanced services and a decline in manufacturing, along with the impact of automation at firms, and general trends of the servitisation of the economy. Given these, science, technology and innovation policies should incorporate a new conceptualisation of industry at their foundations, and so move forward in two directions: the first would centre on providing funding instruments that foster competitiveness in the advanced services sectors, placing greater emphasis on supporting non-technological innovation and business models that bring about the servitisation of the manufacturing industry; and the second would be aimed at redirecting the Basque Science, Technology and Innovation Network (RVCTI) towards this 'new Basque industry', where a multidisciplinary approach and connections between technological and social sciences backgrounds take on more importance, and so the relationships and weights of the different stakeholders in the network will need to evolve along these lines.
- *Cluster policies:* In the case of cluster associations, these will need to evolve alongside changes in the structure of production. This would entail, among other things, putting in motion hybridisation processes between existing clusters. This evolution should reflect a stronger orientation towards advanced services. Additionally, cluster associations can play a key role as intermediary stakeholders in identifying the skills needs of different clusters, and consequently, work on mismatches between skill supply and demand. For this rea-

The structural changes facing the Basque Country require greater resilience through adaptability policies

It is necessary to stimulate business involvement in training through incentives, regulation and intermediary stakeholders

son, greater participation by educational institutions in the associations should be encouraged.

- *Internationalisation policies:* As in the case of the previous policies, it would be advisable to adapt business internationalisation policies to the new industry. Additionally, policies for attracting talent should be adapted to the challenge of overqualification, which would involve not strengthening general policies of attracting people with a higher level of education, but rather targeting specific types of talent, as do Ikerbasque and Bizkaia Talent, for example, in areas such as university teaching staff, research, management teams, etc., where a lack of diversity and international backgrounds can be a serious handicap.

What is more, new industrial and innovation policies, noteworthy among them RIS3, have a key role in regional resilience. Thus, the more diversified a region is, the greater resilience it will be able to demonstrate in response to these structural changes. In this regard, the recommendations to Basque RIS3, given the challenges of the skill supply and demand system, would be:

- Support the development of capabilities and qualifications in the spheres where there is expected to be undercoverage of branches of specialisation.
- Promote sophisticated demand for advanced services and servitisation in the current industrial specialisations. One formula for this is to foster cross-specialisation or hybridisation among the different strategic priorities and opportunity niches in RIS3. In addition, it would be advisable to promote the development of industries related to advanced services and explore the inclusion of industrial SMEs in this transformation.
- Utilise steering groups as spaces for dialogue where the needs of the skills system are detected, reflecting on the solutions to the different mismatches that exist and their development.
- Include the challenges of the skills system as a cross-cutting driver in RIS3. It would also be necessary to analyse what key stakeholders in this area are little represented in this regard, such as smaller firms, other stakeholders in the skill formation system, or intermediary stakeholders such as local development agencies, etc.

All of this also entails a change in the model of governance for public policy in the Basque Country, as was also noted in the 2017 report. And so it becomes necessary to have a space for dialogue and strategic analysis which incorporates competitiveness and social policies from a holistic perspective, given that there are no permanent mechanisms of participation for all system stakeholders to deal with issues that affect overall strategy. These exist for certain spheres (such as, for example, the Basque Council for Science, Technology and Innovation), but not to present and discuss major trends and challenges (e.g., ageing or the structural change presented in this report) and what these demand in terms of policies and responses from stakeholders. In this regard, it should be pointed out that given the territorial heterogeneity of the Basque Country, and the different mismatches which can be seen at the subregional level, this governance model should ensure a multilevel perspective.

Lastly, it is necessary to underline the importance of these adaptability policies being accompanied by others aimed at adaptation, such as, for example, policies

The necessary policy changes also call for changes in the governance model, one that integrates competitiveness and social policies from a holistic perspective

to offset job losses in order to ensure the sustainable development of the Basque Country and the wellbeing of its people. As stated in the manifesto on the occasion of the tenth anniversary of Orkestra, the main challenge for competitiveness is wellbeing and social cohesion. Dynamic development of skills will ensure that people as active stakeholders in the development and wellbeing of a territory can make a greater contribution to the same, and so they will also benefit from a territory with greater wellbeing and social cohesion. We therefore have the challenge of continuing to move forward on creating environments for learning and skills development throughout people's entire lives.

In order to offset losses due to structural changes it will be necessary to design adaptation policies

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Glossary of acronyms

AES	Adult Education Survey
AMSG	Advanced Manufacturing Steering Group
AS	Advanced Services
BERC	Basic and Excellence Research Centres
BG	Basque Government
Ceprede	Economic Forecasting Centre
Confebask	Basque Business Confederation
CVTS	Continuing Vocational Training Survey
CME	Coordinated Market Economies
EU	European Union
Eustat	Euskal Estatistika Erakundea/Basque Statistics Office
EWCS	European Working Conditions Survey
Fundae	State Foundation for Training in Employment
GDP	Gross Domestic Product
ILO	International Labour Organization
IMH	Machine Tool Institute
INE	National Statistics Institute
IPCC	Intergovernmental Panel on Climate Change
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
IVAC	Basque Institute for Vocational Training Knowledge
IVIE	Valencian Institute of Economic Research
LO	Learning Outcomes
LME	Liberal Market Economies
MCIU	Ministry of Science, Innovation and Universities
MU	Mondragón Unibertsitatea
MVCEP	Basque Framework of Vocational Qualifications and Specialisations
OECD	Organisation for Economic Co-operation and Development

OJT	On-the-Job Training
PIAAC	Programme for the International Assessment of Adult Competencies
PISA	Programme for International Student Assessment
R&D	Research and Development
R&D&I	Research, Development and Innovation
RIS3	Smart Specialisation Strategy
RVCTI	Basque Science, Technology and Innovation Network
SEPE	State Public Employment Service
SMEs	Small and Medium-sized Enterprises
TFP	Total Factor Productivity
UD	University of Deusto
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPV/EHU	University of the Basque Country/Euskal Herriko Unibertsitatea
USP	University System Plan
VET	Vocational Education and Training
VETE	Vocational Education and Training for Employment
VoC	Varieties of Capitalism
WBL	Work-Based Learning
WEF	World Economic Forum

The skills training scheme is a necessary and key element for the competitiveness and well-being of a territory, but alone it is not enough to achieve both: it is not a panacea. The investment made by society, in general, and by the different players, in particular, to improve the level of training will not bear fruit if companies do not subsequently take advantage of it by offering sufficiently complex positions. In other words, it is not enough to act on the training and education offered, it is also necessary to act on the demand, and industrial and technological policies play a key role in this respect.

We must continue to involve companies in skills training and face the challenges posed by a changing economy.

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