A person in a white lab coat is working on a circuit board in a laboratory setting. The person is focused on their work, using a tool to manipulate components on the board. The background is slightly blurred, showing a desk with a keyboard and a pen. The entire image has a blue tint.

Challenge #3

IMPROVE THE TRAINING AND REQUALIFICATION OF OUR POPULATION

EXECUTIVE SUMMARY

- Over recent decades, levels of training in the Spanish population has improved drastically, at a pace only comparable in Europe to Finland. The advances in basic education, the modernisation of vocational training and the expansion of the university system have allowed for the average number of years in education for our population to double; the percentage of adults with no formal education has fallen from 10% to less than 2%, and the proportion of the population with a tertiary level qualification has risen from 16% (born in the 40s) to 47% (born in the 80s). Through these and other advances, Spain has been able to correct decades of delay and approach the human capital levels of the EU-27 average.
- This does not mean, however, that Spain can or should stop there. Despite the advances made, Spain's population remains less trained than the most advanced countries in the EU. In the future, as the knowledge economy grows, technology will transform the productive network, our working age population will shrink, international competition will increase, and threats like climate change will intensify. A well educated and skilled workforce will become even more important.
- In order to avoid being left behind in this emerging scenario, Spain must reduce the proportion of the population with only compulsory secondary-level studies by half, increase the proportion with tertiary level studies (university or higher VT), and put an integrated requalification system in place that allows at least one million workers (employed and unemployed) to update their skills. This is the only way we can make the increases in productivity we need, develop a pattern of competitive economic growth on a global scale, deliver on the green transition and ensure the sustainability of our welfare state over the long term.
- The demographic change and proliferation of digital technologies that will take place over the coming decades will help us achieve this. Between now and 2050, the Spanish population aged between 16 and 24 will fall by 200,000 people compared to 2019. This means that the state will be in a position to double spending on post-compulsory education without incurring an exorbitant increase in public spending, and may reach the percentages of graduates of the most advanced countries in the EU with the infrastructure and human resources already available. The use of technologies like Artificial Intelligence and sensors in our centres will make this progress even more feasible.
- The implementation of an efficient and truly integrated requalification system will require regulatory and cultural changes for employees and employers, and significant increase in funding and a better coordination between educational and cultural institutions of the public and private sector. There's no reason to think we cannot achieve this. Spain was able to create 2 million training places in higher VT and universities between 1980 and 2020, and may create a million places for much shorter training programmes between now and 2050.

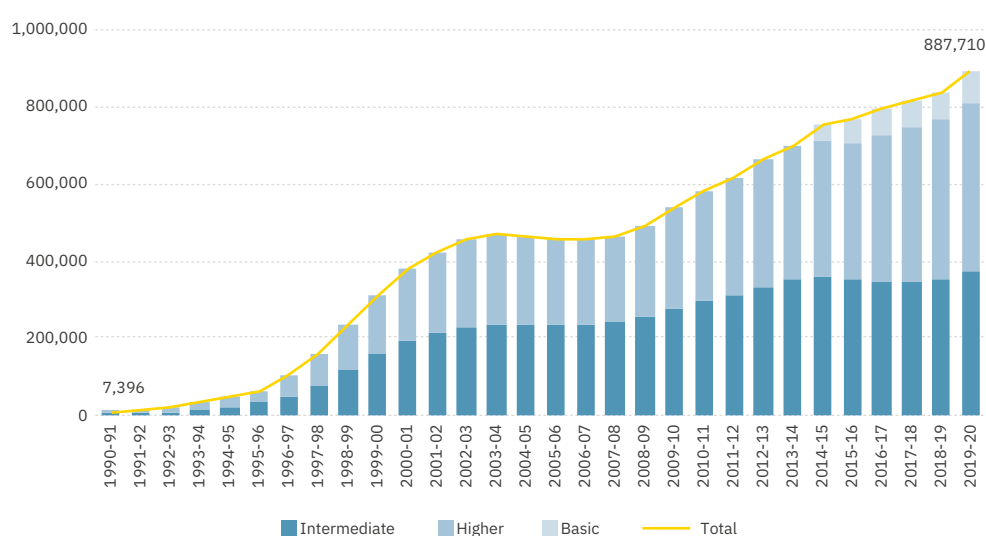
THE PAST: PROGRESS MADE

On 15 June 1977, the Spanish population participated in democratic elections for the first time in forty years. The 18 million men and women who went to the polls that day were a young population, working and full of hope, but less educated than most contemporary European societies, the result of an archaic education system that saw Spain fail to record improvements in human capital for four decades.¹ In 1977, 10% of the Spanish adult population were unable to read or write, 74% had no education beyond primary schooling and fewer than 6% had any higher education qualification.²

The Parliament formed as a result of those elections designed a modern and progressive Spanish Constitution that recognised “everyone [citizens] has the right to education” and contained a commitment to “a policy guaranteeing vocational training and requalification” for all workers.³ **And so began one of the most spectacular training revolutions in 20th century Europe, with Spain making up for much of the time lost and reaching the EU average human capital levels.**

In addition to the achievements in levels of primary and secondary education [see chapter 2], there were other equally notable achievements in the adult population. One of those was **root and branch reform of Vocational Training (VT)**. From the 1990s on in particular, vocational training became part of the education system. Human resources were extended, access routes were diversified and the curriculum was updated, progressively adapting to the skills demanded by the productive network. Thanks to this, VT ceased to be an educational path with poor implementation and poor social perception, and became a modern and competitive option for entering the world of employment. Since then, the number of people registering for VT courses has risen from 7,300 to 887,000 [Fig. 1] and the levels of employability, salary and job satisfaction for the VT graduates have improved drastically to reach, and in some cases exceed, those for university degrees holders.⁴

Fig. 1. Number of students registered for Vocational Training in Spain



Source: Authors' own, based on data from the OECD and the Department of Education and Vocational Training.⁵

At university level, progress has been equally significant. Over the last four decades, Spain has been able to modernise and grow its university system, reaching the levels of the most advanced countries on the Continent [Fig. 2].⁶ The change began with huge increase in the number of universities, from 30 in 1980 to more than 80 today,⁷ many of them home to researchers of the highest quality and cutting-edge infrastructures. A decentralised model was developed that prioritises equal opportunities over the creation of centres of excellence, in contrast to the approach taken, for example, in the United States. As a result, today Spain has no university in the world “top 100” but has 40 (half of the total) among the top 1,000. In fact, **Spain has one of the highest ratios of cutting-edge universities per million inhabitants in the world**⁸ [Fig. 3].

Fig. 2. The 12 best university systems in the world according to the QS ranking, 2018

Position	Country	Score
1	United States	100
2	United Kingdom	98.6
3	Australia	93.8
4	Germany	93.4
5	Canada	90.4
6	France	86.8
7	Netherlands	84.9
8	China	84.5
9	South Korea	83.5
10	Japan	82.1
11	Italy	77.8
12	Spain	75.7

Below Spain are 5 EU-8 countries⁹: Sweden, Belgium, Finland, Denmark and Austria.

Source: Drafted by the authors based on the QS RANKING¹⁰

Fig. 3. Universities in the world top 1,000 per 10 million inhabitants

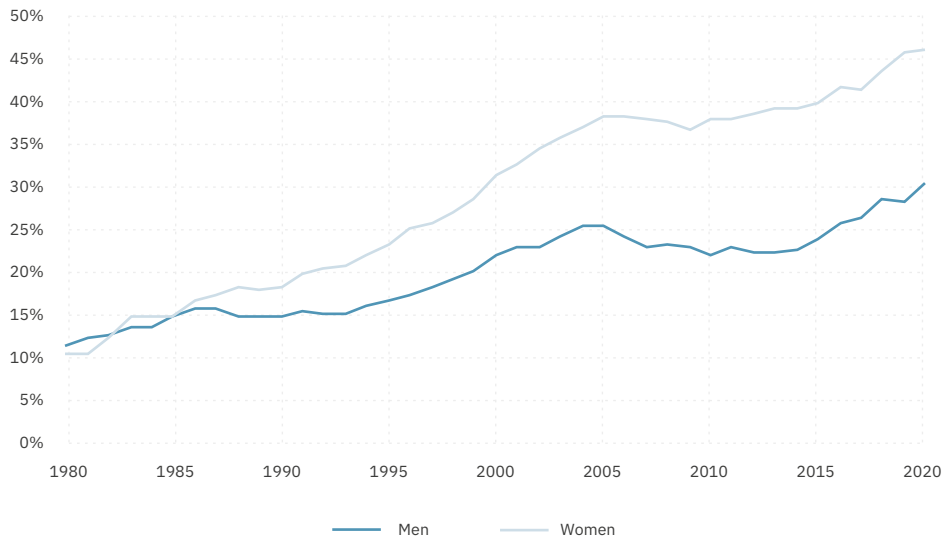
Position	Country	No.
1	Luxembourg	16.2
2	Austria	15.8
3	Finland	14.4
4	Sweden	13.6
5	Cyprus	11.4
6	Denmark	10.3
7	Ireland	10.1
8	United Kingdom	9.7
9	Spain	8.5

Below Spain are 4 EU-8 countries (Netherlands, Belgium, Germany and France) and countries such as the US, South Korea, China and Japan.

Source: Drafted based on the Academic Ranking of World Universities, Eurostat and the World Bank.¹¹

These universities are also distributed throughout the country, all autonomous communities have at least one public university and all provinces have at least one centre for higher education. There are inconveniences to this geographic dispersal (e.g. difficulty taking advantage of economies of scale) but there are also enormous advantages. Among others, it has served to boost economic and social activity throughout the country,¹² and to reduce the private cost of university studies (e.g. housing rental). This, combined with the spectacular increase in grants (the percentage of university students receiving grants has risen from 19% in 1996 to 38% in 2017),¹³ has tripled the proportion of people studying at university in Spain each year and has helped to expand the educational and, therefore, professional opportunities for millions of women [Fig. 4].¹⁴ Thus, Spanish universities have gone from being an elitist institution to a pluralist one open to citizens, which, in addition to training competent professionals,¹⁵ acts as one of the principal mechanisms for social mobility and gender equality in the country.

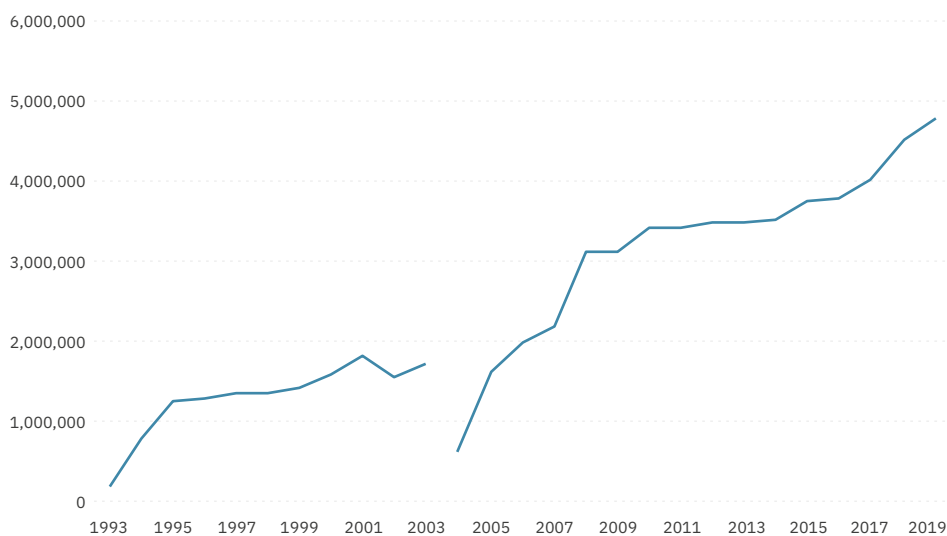
Fig. 4. Percentage of university graduates (25-29 years old) by gender in Spain



Source: Drafted by the authors based on data from Bentolila *et al.*¹⁶

Advances in the area of training and requalification for the working population have been equally important. In 1992, the government, companies and trade unions signed the first *National Agreement on Continuous Training*,¹⁷ in which the mechanisms were created to finance, coordinate and guarantee instruction and upskilling for those in employment. This agreement was followed by others, the fruit of collective partnership and growing interest of companies in human capital. Thus, Spain has developed, in just two decades, a broad and dynamic training system for workers, which, although far from the country's needs,¹⁸ is already comparable to that of many European countries. The data reflect the scale and velocity of these changes. Between the 1990s and today, **the resources allocated to active training policies have increased,¹⁹ the number of workers who participate in these requalification programmes has risen from 198,000 to 4.7 million [Fig. 5]** and **the number of training hours has increased from 19 million to reach 75 million in 2019.**²⁰

Fig. 5. Number of participants trained in Spain

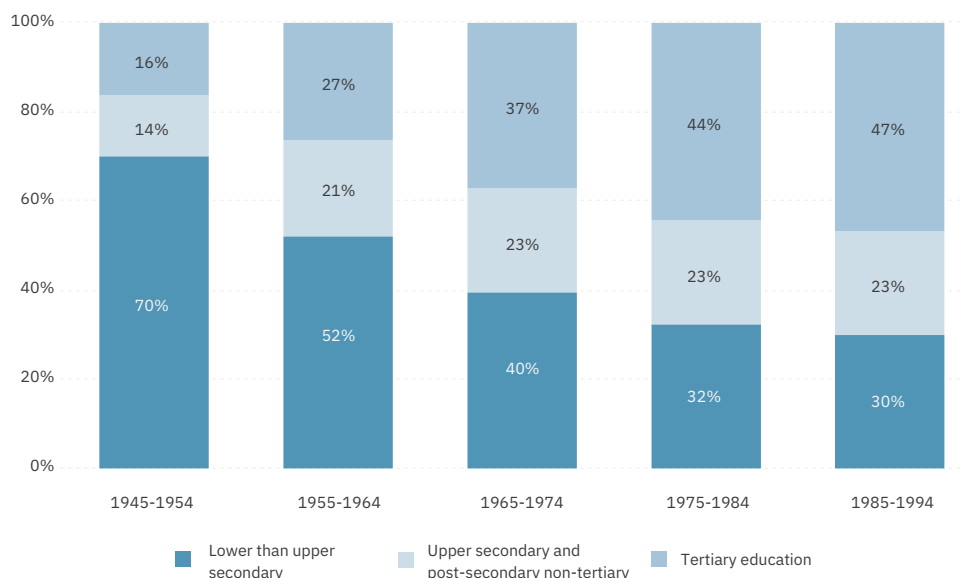


Source: Drafted by the authors based on data from FUNDAE.²¹

Advances in training for unemployed people have been substantially more modest, although there have been significant improvements. Joining the EU in 1986 allowed Spain to access the European Social Fund and launch the *Plan FIP (National Training and Employment Plan)*, which constituted the start of active employment policies in Spain and the reform of the vocational training system. Since then, the capacities of the National Employment System have been improved, consolidating allocations to finance training and develop a mechanism to detect training needs.²²

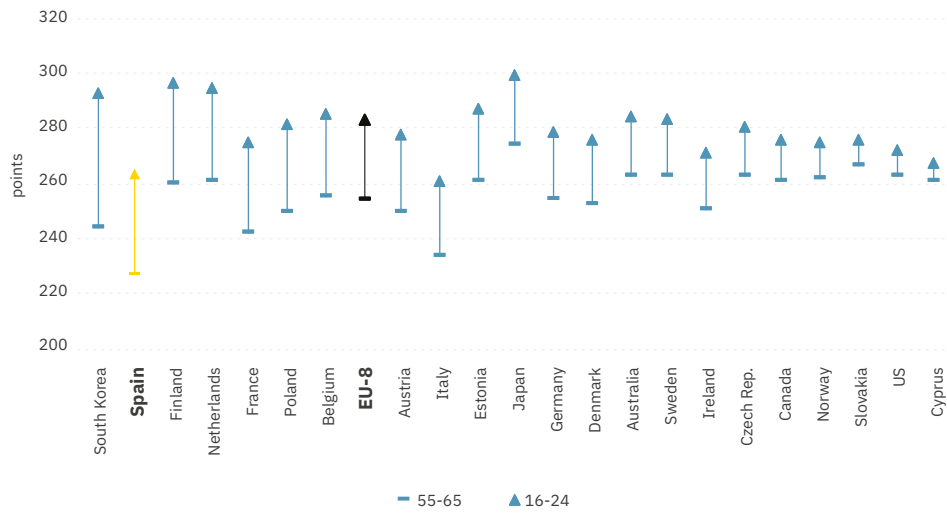
Overall, the advances described have allowed for the average number of years training of the population to double between 1977 and 2010,²³ the percentage of adults without education has fallen from 10% to less than 2%,²⁴ and the proportion of people with tertiary level qualifications (university or higher VT) has increased from 16% of the population born in the 1940s to 47% of those born in the 1980s [Fig. 6]. Thanks to this, the basic skills and professional knowledge of the Spanish population have improved drastically, at a pace only comparable in Europe over the same period with Finland [Fig. 7].

Fig. 6. Population by maximum education level reached according to birth cohort in Spain



Source: By the authors based on data from the INE (National Statistics Institute of Spain).²⁵

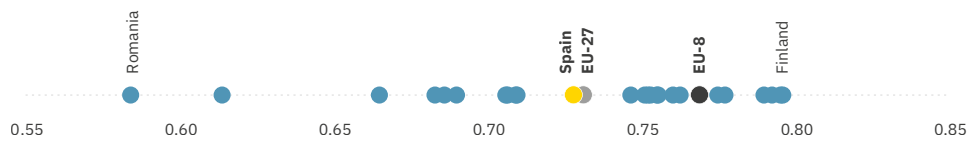
Fig. 7. Difference in reading comprehension results among young people (16-24 years old) and older people (55-65 years old), 2012



Source: Author's own based on data from the OECD.²⁶

In this way, the country has been able to correct decades of delay and **converge, in most indicators, with the EU-27 in human capital** [Fig. 8].

Fig. 8. Human capital index, 2019



Source: Authors' own, based on World Bank data.²⁷

THE PRESENT: UNFINISHED BUSINESS

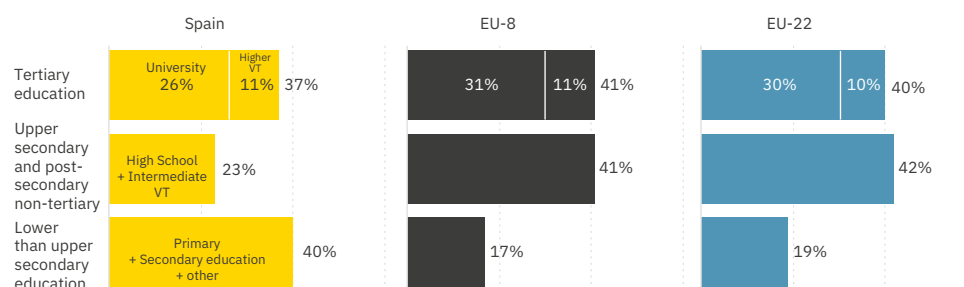
The progress made in human capital in Spain in recent decades has been more than remarkable. This does not mean, however, that our country can or should stop there. In the future, as the knowledge economy grows, technology will transform the productive network, our working age population will shrink, international competition will increase and threats like climate change will intensify. A well trained and up-to-date workforce will become even more important.

For this reason it is important for Spain to continue to improve the quality of its human capital, resolving the pending issues to **become one of the most advanced countries in Europe on this front**. Only in this way can we make the productivity gains we need, develop a pattern of competitive economic growth on a global scale, deliver on the green transition and ensure the sustainability of our welfare state over the long term.

What are the unresolved issues? Here are three which stand out.

Firstly, **the high proportion of the Spanish population whose education does not go beyond compulsory secondary education**. While the population aged 25 to 64 with higher education (university, higher VT or equivalent) in the country is similar to that of the most advanced countries in Europe (reflected here under “EU-8”), the proportion of people who have an upper secondary qualification (Baccalaureate, intermediate vocational training or other equivalent qualifications) is lower than that of our European neighbours (23% compared to 42% among the EU-22 or 41% of the EU-8) [Fig. 9].

Fig. 9. Population aged 25 to 64 by level of education, 20180

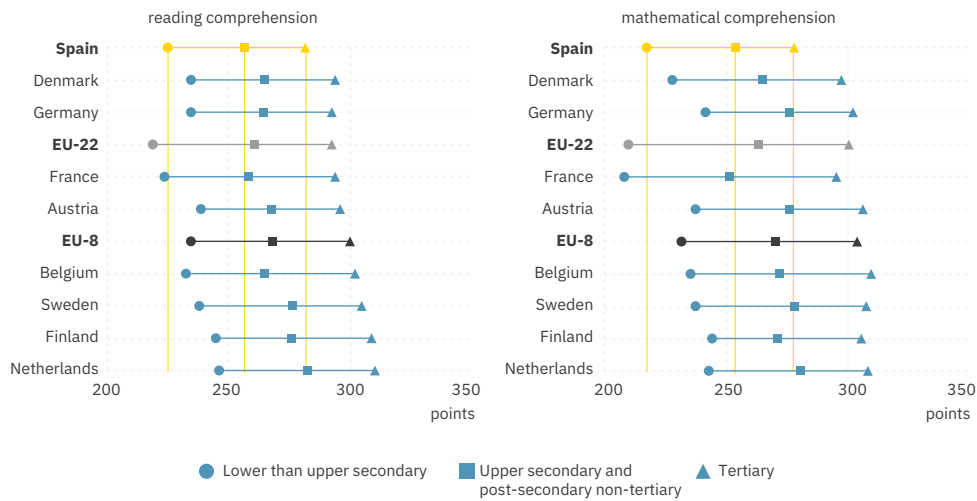


Source: Author's own based on data from the OECD.²⁸

This shortcoming is not just a situation inherited from previous generations, but a chronic problem that is reproduced across the youngest generations and comes from elevated school dropout rates and the rigidity of our training models.²⁹ As a result, **in Spain today, there are more than 10 million adults** (48% of the population aged between 25 and 64) **who hold no formal professional qualification** (VT or university);³⁰ that is, they have no professional skills, or if they do have them they are not accredited.³¹

The second unresolved issue of our human capital is the improvement of their skills. In Spain, the adult population has a lower command of basic skills like reading comprehension and mathematics than its European partners. This problem is found at all training levels. For example, a person with a third-level qualification in Spain has a lower level of reading comprehension and mathematics than a Baccalaureate graduate in the Netherlands [Fig. 10].

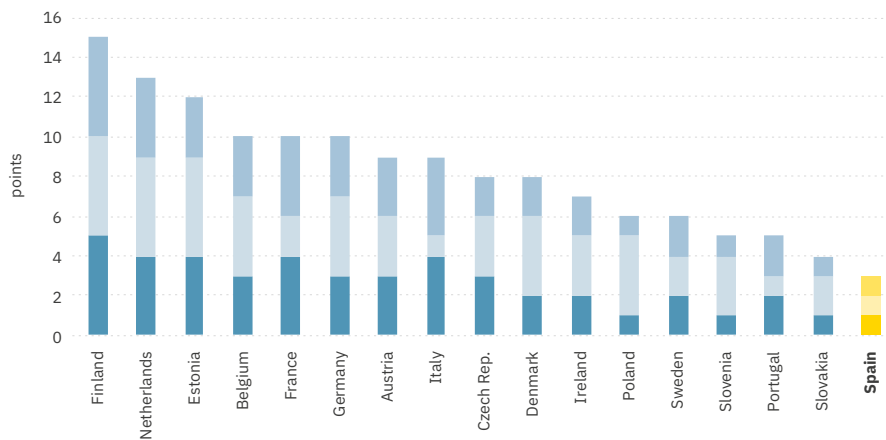
Fig. 10. Differences in score for reading comprehension and mathematics in the adult population aged between 25 and 65 by education levels, 2012 and 2015



Source: Author's own based on data from the OECD.³²

The same can be observed with other key skills. **The Spanish population falls below the European average in fundamental areas like knowledge of foreign languages,³³ digital skills,³⁴ and financial training,³⁵ and in the command of soft skills** such as critical thinking, creativity and curiosity [Fig. 11], which are expected to increasingly gain in importance for personal and professional development.³⁶

Fig. 11. Relative levels of social skills



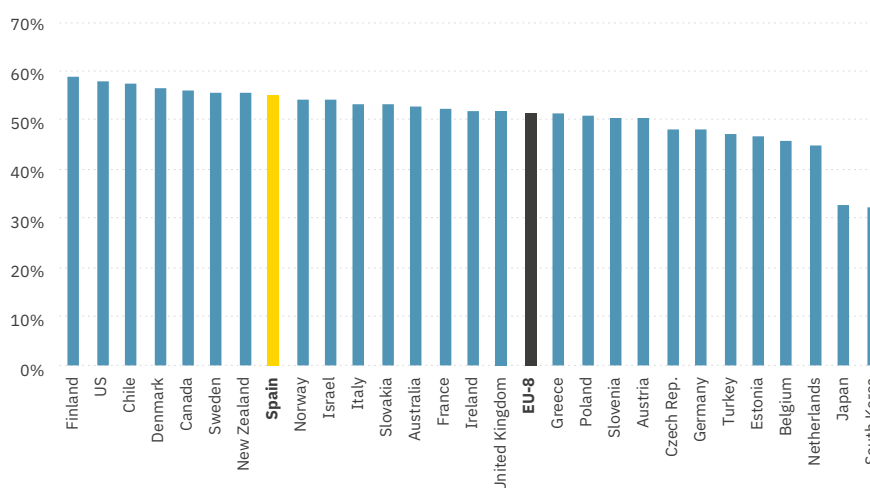
Source: Authors' own, based on World Economic Forum data.³⁷

Inevitably, **these shortcomings are reflected in our labour market.** Surveys indicate that in Spain, at least 2 in 10 workers do not have the necessary skills to adequately perform their work,³⁸ that 3 in 10 entrepreneurs have a low level of studies,³⁹ and that 2 in 10 employers cannot find adequate profiles for vacant positions, a proportion that has almost tripled in recent years.⁴⁰

The third unresolved issue for Spain is the promotion of lifelong learning. Evidence shows that the participation of the adult population in requalification processes is linked strongly to higher productivity (between 5% and 30%),⁴¹ greater employment opportunities,⁴² and higher salaries.⁴³ For this reason, promoting lifelong learning has become an shared goal for the most developed countries in the world.

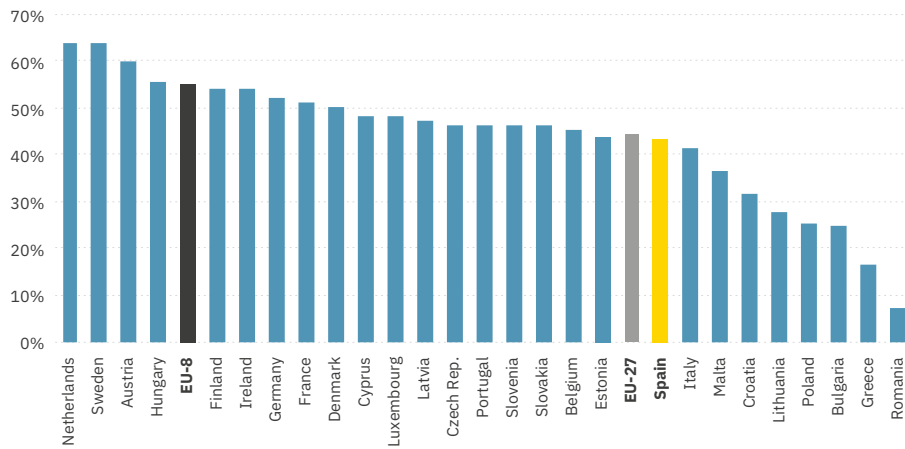
In Spain, however, progress has so far been limited on this front.⁴⁴ The Spanish population is one of the most predisposed to continuous learning of the OECD [Fig. 12]. However, the lack of opportunities to do so and the fact that most of the funds of the State and companies reserved for this purpose are not used, has led to a situation where only 4 in 10 adults participate in regulated or unregulated training and requalification programmes every year. This positions us at around the EU-27 average, but below the EU-8 [Fig. 13].⁴⁵

Fig. 12. Predisposition to continue learning, adults (25 - 64 years), 2015



Source: Author's own based on data from the OECD.⁴⁶

Fig. 13. Percentage of adults (aged 25 - 64) who say they have participated in training activities in the last 12 months, 2016



Source: Authors' own, based on Eurostat data.⁴⁷

The highlighted shortcomings are having a negative effect on our economy and our society.

There is ample empirical evidence that demonstrates that the skills deficiency in Spain is linked to lower productivity,⁴⁸ less innovation,⁴⁹ higher rates of unemployment,⁵⁰ and greater income inequality between citizens [see chapter 1].⁵¹ The skills deficiency is also linked to lower levels of health,⁵² citizen security, civic participation,⁵³ and environmental awareness.⁵⁴ From now to 2050, this association will only become stronger as the world shifts towards a more knowledge-based economy and less intensive use of the physical factors of production. **Human capital will form the basis of economic prosperity.** Spain must therefore resolve these pending issues and converge with the EU-8 countries in terms of the population’s level of training.

Although the challenge is considerable, there is no reason to think we cannot overcome it.

Over recent decades, we have managed to provide the country with the institutes, universities, VT centres and requalification bodies necessary for the working population and the unemployed. What we have to do over the coming decades is correct the inefficiencies and expand the strengths of these mechanisms in order to take full advantage of their potential.

The channels of improvement

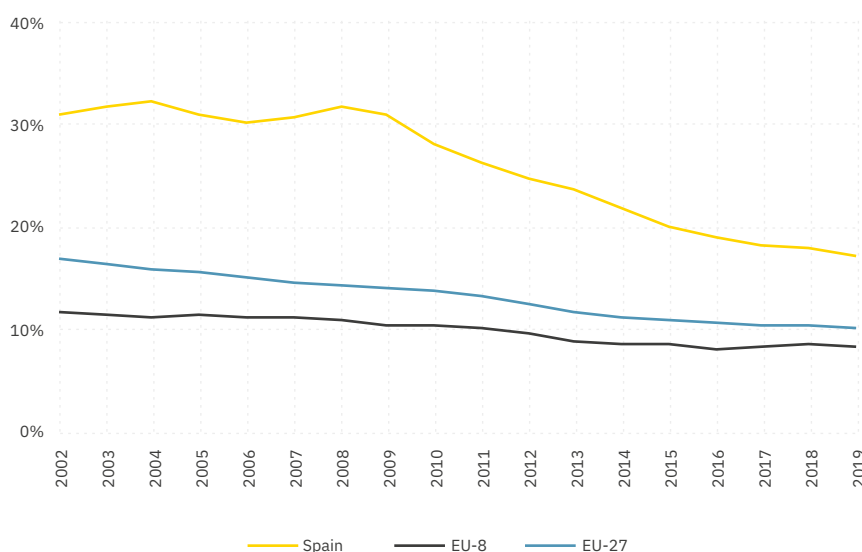
I. Minimise inherited shortcomings in the pre-school, primary, and secondary education stages

As we saw in the previous chapter, the number of students in Spain that are held back a year or drop out in primary and secondary school is too high, and there is a low level of learning compared to the EU-8. These problems build up and become fossilised in the active population and, in part, explain the shortcomings of our human capital. Over the coming years, it will be necessary to correct them and ensure that every student realises their potential [see chapter 2].

II. Consolidate Vocational Training as one of the principal channels for training and requalification in Spain

Spanish VT has improved considerably in recent decades, both in terms of coverage and quality.⁵⁵ Even so, this training option still does not have the same level of implementation as in other European countries, especially those with a higher level of economic development. This is due to two phenomena. Firstly, **a significant proportion of students in Spain, even though they would be interested in pursuing VT, leave school before reaching that level of education [Fig. 14].** This is one of the consequences of the country's high dropout rate, and one of the keys to understanding the shortage of qualified professionals.

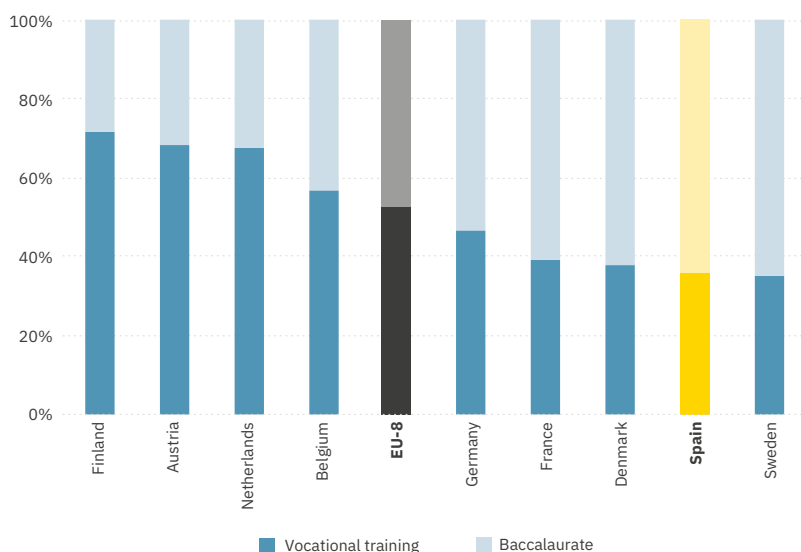
Fig. 14. Percentage of the population aged 18- 24 who drop out of education



Source: Authors' own, based on Eurostat data.⁵⁶

Secondly, **the majority of pupils who completed compulsory secondary education are more attracted to studying baccalaureate than VT as an access route to university** (perceived as the goal in education for most students) **or as an option for professional training.** In 2018, only 36% who completed compulsory secondary education opted for VT, compared to 64% who preferred baccalaureate studies, a proportion that differs slightly from what we find in the EU-8 where VT is the predominant option [Fig. 15].

Fig. 15. Percentage of student population enrolled in baccalaureate and intermediate VT, 2018



Source: Authors' own, based on Eurostat data.⁵⁷

Various factors explain this bias in the selection of education programme:

- the lack of social recognition of VT in Spain among parents, teachers, guidance counsellors, and students;⁵⁸
- the shortcomings still present in the design and implementation of this training option;⁵⁹
- the persistence of old stereotypes, meaning that 80% of women are concentrated in four very specific professional categories (health and social care, administration, public services, and hair and beauty) and remain under-represented in technical-industrial qualifications, which have the highest demand;⁶⁰
- the nature of the Spanish productive network, with an abundance of jobs that do not require a high level of technical skills;⁶¹ and
- the limited implementation of dual VT⁶² in the country, with only 1% of students enrolled in this format, compared to 18% for the OECD and 19% for the EU-8.⁶³

Over the coming years, we have to tackle these factors and **consolidate VT as one of the principal training and requalification routes for our population**, following the model of the most advanced countries in the EU.

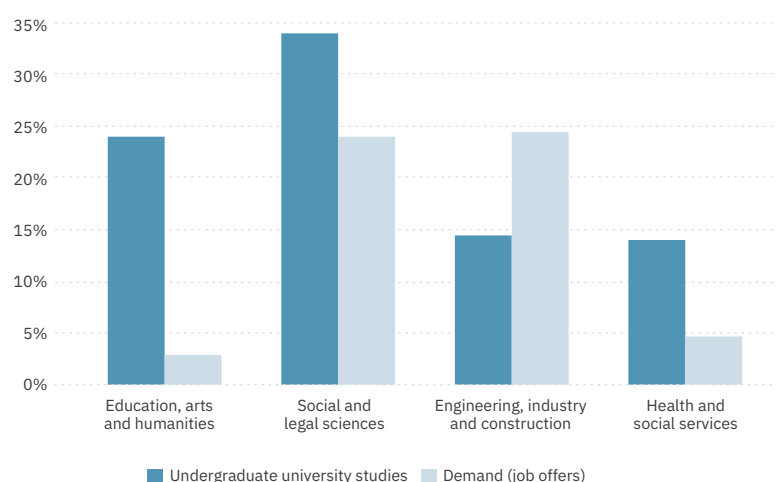
III. Boost the contribution of the university system to the training and requalification of the workforce

As we have seen, Spain has an advanced university system that stands out for its educational accessibility and its equal distribution across the length and breadth of the country. **University has been one of the key elements responsible for the improvement in Spain's human capital in recent decades.**

Even so, our university system still has a number of aspects that prevent it from reaching its full educational potential. To start with, **there is a wide and growing gap between what is taught at Spanish universities and what the productive network demands.**⁶⁴ This gap impacts both qualifications (obsolete curricula, poorly connected with reality) and the skills acquired therein, and is a significantly limits the employability of graduates and the country's productivity. It is clear that universities should not be oriented towards satisfying the immediate needs of the labour market. But it is also true that they cannot turn their back on it completely. Unlike other country's universities, Spain's public universities have little connection with the business world and receive funding primarily on the basis of the number of students enrolled, with little weight placed on the percentage who find employment and develop a satisfactory career once they graduate.

There is also **a considerable imbalance between the qualifications most demanded by students and those most sought by employers.**⁶⁵ This is the case in practically all countries in Europe, although it takes a different shape in different countries. In Spain, the degrees most demanded are those in engineering, industry and construction, accounting for almost 25% of the total job offers. However, only 15% of the graduate population pursue these degrees. On the contrary, almost 25% of people pursue studies in education, arts and humanities, which account for only 3% of job offers [Fig. 16].

Fig. 16. Distribution of employment offers of population enrolled in university degrees in 2013- 2014 by professional categories in Spain



Source: Drafted by the authors based on data from the CES.⁶⁶

Another problem is the low levels of learning. It is often said that Spain has an “overqualification” problem. This is partly true. In 2019, 35% of employment contracts signed by Spanish university graduates were for low-skilled jobs,⁶⁷ something that has a damaging effect on workers and on companies,⁶⁸ and which should be tackled in the future through a modernisation of the productive network and a change in the hiring culture [see chapters 1 and 7]. However, we must not lose sight of the fact that, what underlies this data is often not a problem of “overqualification” as such, but rather “overtitling”, as in many cases individuals who, although they hold a higher education title, only possess intermediate or low skills. The aforementioned results of the *Programme for the International Assessment of Adult Competencies* (PIAAC) illustrate this fact. In Spain, only 12% of the adult population (25 to 64 years old) who are university graduates present a high level of reading comprehension, compared to 30% or more in countries like Finland, Netherlands and Sweden.⁶⁹ When the skills of the youngest sector of the population are analysed (20 to 34 years old) we encounter similar results.⁷⁰ Other standardised tests support this reading: in Spanish universities the majority of students graduate with a command of basic skills (reading, mathematics and science) that is considerably lower than neighbouring countries.⁷¹

The reasons behind this phenomenon are more complex and can mainly be linked to the shortcomings of the primary and secondary education, but also with the way in which academic degrees are designed and the way in which universities operates. The accreditation system and Spanish five-year teaching periods place importance on quantity over quality of teaching, disincentivising improvements to learning and weakening the role of the university as an instructor in the professional profiles required by the productive network. An important element of financing for public universities depends on the number of students, disincentivizing a more demanding approach to admission and evaluation processes. At the same time, the regulatory rigidity and the internal governance methods make it difficult for universities to improve their educational options with the flexibility needed. Today, it is the teachers themselves who must decide what changes are made to undergraduate and postgraduate programmes and take on the work to amend them, something that is barely recognised or compensated by the system. When, nonetheless, they decide to do so, centres face slow and dysfunctional bureaucracy for accreditation. As a result, most of the content comprising the curriculum is not modified and much of the material that is changed is already obsolete by the time it is launched.⁷²

Finally, it is worth highlighting **the poor service Spanish universities have provided, and still provide, for the requalification of the working population.**⁷³ Most training options remain in the hands of postgraduate schools, business schools, academies and other training centres (generally private) whose options are limited themselves and not always accessible to citizens. **Spanish universities under-exploit their training potential in this regard.** Universities that offer short courses for working professionals who want to up-skill are in the minority. This today constitutes a limitation, but also presents **an immense opportunity for future development.** As we shall see later, professional requalification can become the principal channel of growth for universities over the coming decades, as demographic change sees the numbers of 18 to 25-year-olds in the country fall.

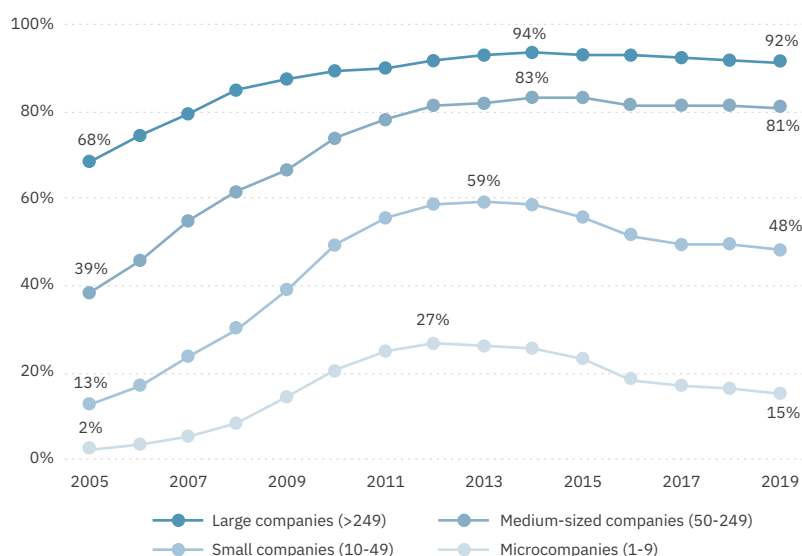
IV. Build an integrated education and requalification system for the active working population.

The time when learning was confined to the first two decades of one's life is over. At present, rapid change in the productive network is pushing workers towards constant requalification, the frequency and extent of which will only increase in the future.

To provide the working population with this training, Spain has, to date, had **an integrated education and requalification system composed of three pillars**: 1) In-company training developed by companies for their employees (often referred to as “training on demand” in Spanish literature); 2) “supply-side training” provided by the State and the Autonomous Communities; and 3) training pursued by persons on an individual basis through regulated or unregulated programmes (e.g. an online course). We shall examine below the situation for each of these.

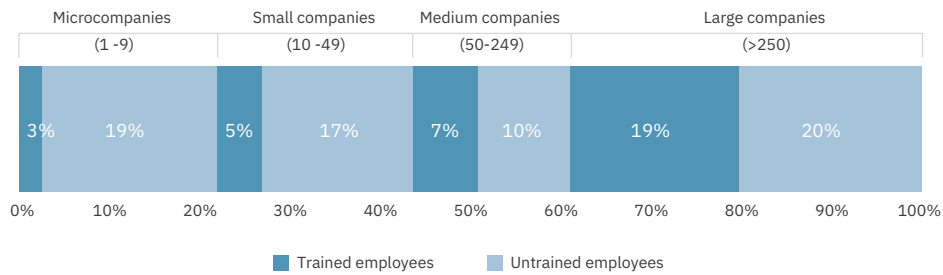
In-company training has improved considerably in Spain. The number of companies offering training to employees has multiplied fourfold over the last two decades,⁷⁴ expanding in all levels of the productive network [Fig. 17]. It remains, however, a low proportion in comparison to the most advanced countries in the EU, due, primarily, to the predominance of small and medium-sized enterprises in our productive structure⁷⁵ [Fig. 18].

Fig. 17. Percentage of companies who train their employees by size of company in Spain



Source: Drafted by the authors based on data from FUNDAE.⁷⁶

Fig. 18. Weight of working population trained and not trained as a total of the salaried population in the private sector, by type of company in Spain



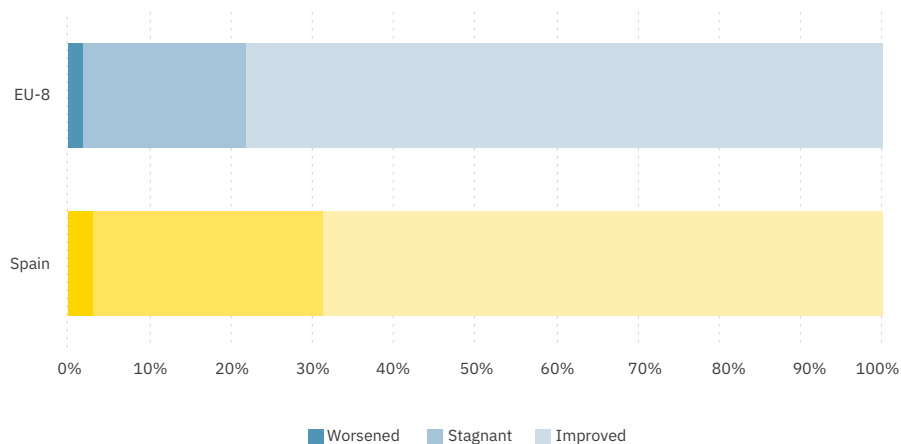
Source: Drafted by the authors based on data from FUNDAE and the Department of Industry, Commerce and Tourism.⁷⁷

The number of employees who participate in training programmes has grown considerably, rising from 494,468 in 2004 (3% of the total) to more than 2.9 million in 2019 (15% of the total).⁷⁸ Nevertheless, it is once again a small proportion in comparison to other European countries,⁷⁹ and also present considerable imbalance in terms of gender, age, education and professional sector.⁸⁰

We must also take into account that **the duration of training is falling**, which in many cases leads to a reduction in the knowledge and skills acquired. If, in 2007, the average duration was 22 hours in large companies and 29 in medium-sized companies, in 2019 those figures were 11 and 13 respectively.⁸¹ The explanation for this appears to lie in the fact that many companies are expanding their training options to more members of staff, but reducing the duration and, in all probability, the quality.

These factors, together with low funding and the high numbers of temporary and precarious contracts typical of the Spanish labour market, mean that *in-company* training in Spain is generally insufficient, and that **workers learn less when employed than their EU-8 counterparts** [Fig. 19].

Fig. 19. Percentage of workers whose skills have declined, stagnated, or improved since the time they joined their current job, 2014



Source: Authors' own, based on CEDEFOP data.⁸²

In terms of supply-side training provided by public institutions, the lack of reliable and unified data prevents us from getting a clear picture of what is happening at the national level. In any case, **stagnation or even decline over the last few years is discernible**. The number of employed participants in public requalification programmes peaked in 2008, with 1,066,165 participants⁸³ falling thereafter to 116,317 in 2019,⁸⁴ while also replicating the same biases as in-company training.⁸⁵ There are several factors explaining this situation. The lack of qualified teaching staff, restrictions on employed persons undertaking face-to-face training⁸⁶ and the erratic and insufficient nature of funding⁸⁷ are just some of these.

Finally, it is worth mentioning **the training that individuals undertake on an individual basis through generally short and non-regulated programmes** that are either face-to-face or online, taking place in academies, training centres and on digital platforms. This form of education is known to have grown significantly in recent years, although it remains a marginal training pathway in Europe.

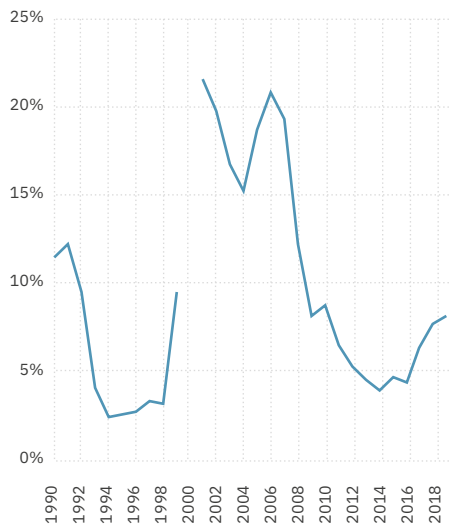
Reinventing our training system for unemployed people

There is ample empirical evidence that **participation in quality requalification programmes significantly increases unemployed people's chances of finding a job and of improving their earnings and working conditions relative to their previous position**.⁸⁸ As such, requalification systems for the unemployed are considered a key part of any country's economic and social policies.

In Spain, however, the public system of training and requalification for the unemployed has had severe deficiencies in its design, operation and supervision for decades. Rather than increase, **the proportion of unemployed people participating in training programmes coordinated by the public sector has more than halved over the last two decades [Fig. 20]**, as has the number of hours dedicated to their requalification.⁸⁹

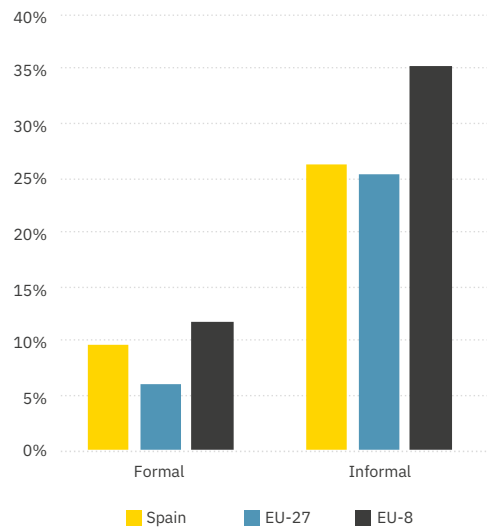
In total, it is estimated that, **in 2016, 36% of unemployed people participated in some training activity (formal or informal) in Spain**, a proportion 11 percentage points lower than that recorded in the EU-8 [Fig. 21].

Fig. 20. Percentage of unemployed persons in Spain who have received training from the State or the Autonomous Communities



Source: Drafted by the authors based on data from the SEPE and the OECD.⁹⁰

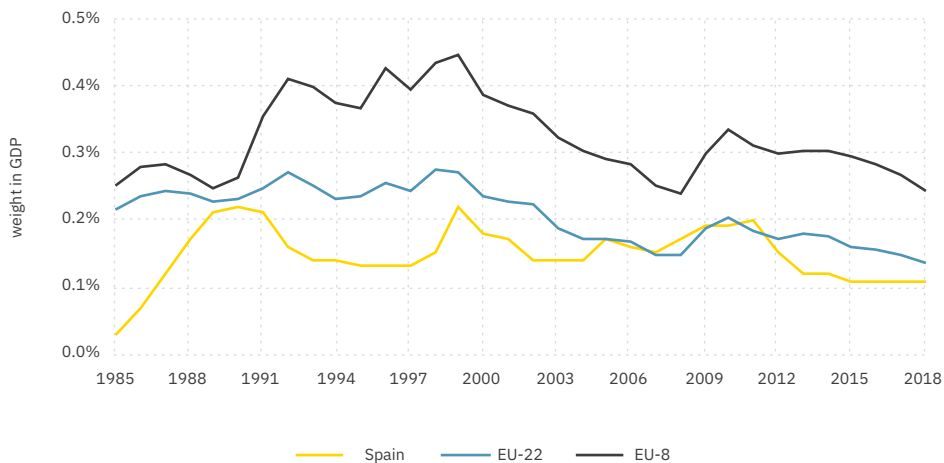
Fig. 21. Participation rate of the unemployed population in education and training by type in the last 12 months, 2016



Source: Drafted by the authors based on data from Eurostat.⁹¹

Part of the problem is **insufficient and unstable funding**. Spain devotes only 0.11% of its GDP to the training and requalification its active population, notably unemployed, compared to 0.14% for the EU-22 and 0.25% for the EU-8 [Fig. 22]. In terms of spending on training per unemployed person, this equates to approximately 350 euros per person in Spain compared to an average of 3,000 euros in the EU-8.⁹²

Fig. 22. Public spending on active training policies



Source: Drafted by the authors based on data from the OECD.⁹³

Furthermore, the level of this funding is highly conditioned by the economic cycle, since a very significant part of funding (around half) depends directly on companies' social security contributions per worker, which tend to be reduced during recessions. **This means that all too often resources for training are cut just when they are most needed.**

In addition to the lack of funding, there are other problems, such as those arising from the institutional framework which up until now has been the backbone of active employment policies. In Spain, management powers in the area of training for the unemployed are transferred to the Autonomous Communities, **without an efficient national coordination mechanism** to allow the efforts of the different administrations to be aligned, as is the case for other public policies. This has prevented the development of some key elements designed to organise, promote and streamline the functioning of the system, such as the *Pluriannual Scenario* provided for in Article 5 of Law 30/2015, which regulates the Vocational Training system for employment in the labour sphere.⁹⁴ It has also prevented the creation of a comprehensive database that would help to **adjust training options in real time to meet the changing needs of the productive network**, following in the wake of the *Report on Prospecting and Detection of Training Needs*.⁹⁵

To this we must add, finally, **the absence of effective evaluation mechanisms** to distinguish courses that are fit for purpose from those that are not, in order to scale and replicate them; and **the significant shortcomings of our State Public Employment Service (SEPE, by its acronym in Spanish)**, an institution that has not been able to adapt to the changes that have taken place in Spanish society and the labour market in recent decades.

The result of all of the above are **training options of insufficient quality that are not fit for purpose, which, moreover, are poorly valued and are in low demand by both the unemployed and potential employers**. If we want to reduce our unemployment levels in the future and raise the country's labour productivity to EU-8 levels, these shortcomings must be addressed [[see Chapters 1 and 7](#)].

VI. Taking greater advantage of the synergies of the system

Spain is a decentralised state. As such, the management, financing and supervision of training and requalification programmes is spread across a plethora of agencies (state, regional and municipal) and training and requalification centres (public and private). This decentralisation presents challenges, but it **also offers Spain important advantages**, as it allows the system to be adapted to the needs of each territory, to test different solutions simultaneously, and to exchange lessons learned and best practices across the country.

In order to make the most of these advantages, Spain needs to **improve information exchange and coordination** between public administrations, institutions, VT centres, universities and public employment services. It should also **strengthen the role of companies in education and training**, encouraging them to go beyond their own workforces and move towards the EU-8 model, where companies play a key role in the training and requalification of workers, providing quality courses (not only for the employed population), accrediting skills acquired on the job, and helping administrations to design curricula and optimise public training options.

All these improvements will require effort, but they are feasible. The bulk of the resources (human, financial and institutional) needed already exist. It is now a matter of modernising and optimising the various parts of the system. As we will see below, **the coronavirus crisis and the technological changes that will take place in the coming years provide a good opportunity to do so.**

THE FUTURE: THE TRAINING REVOLUTION OF THE ADULT POPULATION

The crisis triggered by coronavirus will lead to a profound transformation of the European productive network in at least two different ways. Firstly, it will accelerate trends of change that were already underway before the virus hit: digitalisation, decarbonisation and the transition from a linear to a circular economy. Secondly, it will lead to a reallocation of resources between sectors: part of the human and financial capital devoted to the activities most affected by the pandemic (such as hospitality and commerce) will be redistributed to other activities (such as care services and technological development).

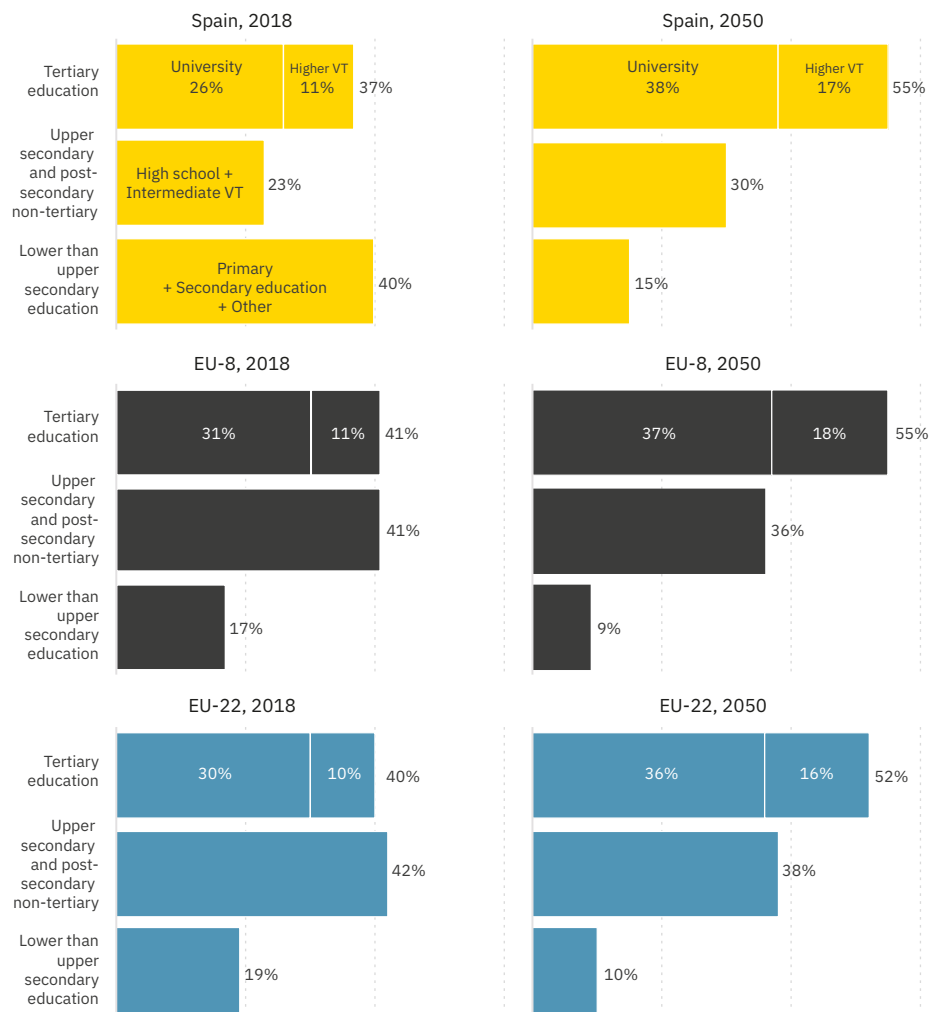
Countries' future prosperity will be largely determined by their capacity to deliver these transformations, which in turn will depend on the quality of their human capital and their ability to adapt it to new productive needs. In this emerging scenario, **Spain is facing a dual challenge. Firstly, to improve their levels of coverage and learning in VT and university education cycles to converge with the EU-8. And secondly, to develop an integrated requalification system to keep the adult population trained and up-to-date over their lifetime.** Only by achieving both will we be able to guarantee Spain's development in the world that is to come.

I. VT and the university of the future

Over the last 30 years, the education of the European population has improved considerably. The average number of years of education has increased by 40%⁹⁶ and the percentage of people who hold higher education qualifications has almost tripled.⁹⁷ All indications are that in the near future this process of educational upgrading will continue. Life in society will increasingly demand more knowledge, the labour market will become more competitive, and jobs that today require an average education will require a higher degree and, in many cases, a postgraduate degree or equivalent [see chapter 7].

The *International Institute for Applied Systems Analysis* estimates that, if the trends of recent decades continue, by 2050, the percentage of people in the EU-22 and EU-8 with higher education qualifications will increase by 12 percentage points or more, while the proportion of people with less than upper secondary education will roughly halve [Fig. 23].

Fig. 23. Educational attainment of the population (25-64 years old) in 2018 and projections to 2050



Source: Drafted by the authors using data from the OECD, *International Institute for Applied Systems Analysis* and Lutz et al.⁹⁸

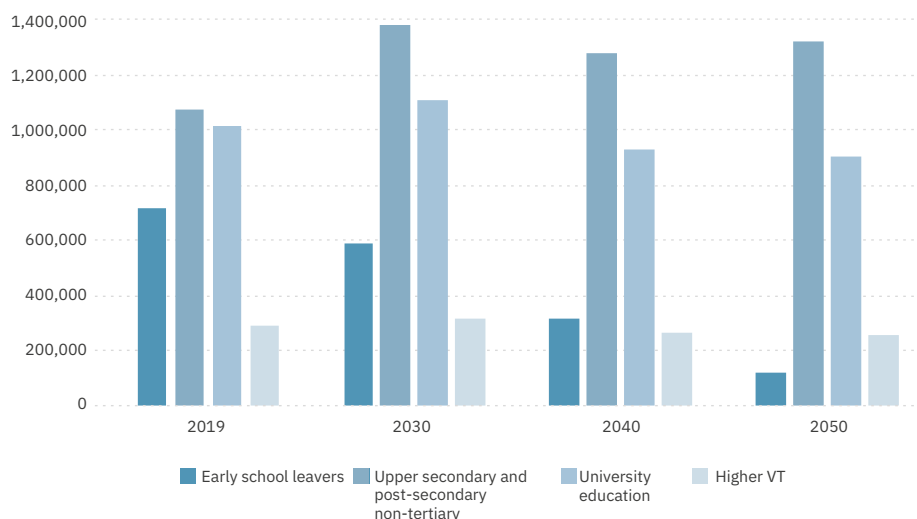
If Spain wants to avoid falling behind in human capital, it will have to significantly improve its educational performance in terms of both coverage and learning outcomes. Fully converging with the EU-8 by 2050 is not feasible, given our starting point.⁹⁹ But what we can do is close the gap that separates us today until we are *on a par* with them in terms of the training of the new generations. The demographic contraction that Spain will experience in the coming decades will provide us with a unique opportunity to achieve this, without incurring an excessive increase in public spending.

There should be three priorities to this.

Firstly, to reduce the proportion of people leaving education without at least upper secondary qualification by a minimum of 25 points. To achieve this, we must tackle the shortcomings of the early childhood, primary, and secondary stages of education already analysed [see chapter 2], and make a firm commitment to intermediate VT, which is considered the most effective and realistic way to reduce school dropouts.

Secondly, Spain will have to increase the percentage of the population with a university degree from the current level of 26% to 38% in 2050 [Fig. 23]. If we take into account the demographic contraction that will affect the younger cohorts in the coming years, in absolute terms, this will mean going from the one million university students (16-24 years old) we have today to around 1,100,000 in 2030 and 900,000 in 2040 and 2050.¹⁰⁰ It is not true, therefore, that our country has a "surplus" of university students. The current number is adequate and will have to be kept relatively stable until the middle of the century [Fig. 24].

Fig. 24. Population aged between 16 and 24 enrolled in different types of studies in Spain



Source: Drafted by the authors based on data from Eurostat, the Department of Education and Vocational Education and Training and Department of Universities.¹⁰¹

The problem of "over-qualification" that exists today will need to be addressed. But the solution for the future should not be to reduce the number of people graduating from Spanish universities but to improve employment rates and generate higher quality jobs [see Chapters 1 and 7]. If Spain wants to one day have the levels of productivity, innovation, competitiveness and employment of Germany, Denmark or Sweden, it must also reach their levels of higher education qualifications.

What is not clear is what kind of institutions will best meet this demand for training. So far this century, Spain's public universities have barely grown and the private university sector has registered the greatest increase, both in the number of centres (from 4 universities in 1990 to 33 today)¹⁰² and in the number of students enrolled (in 1985, students enrolled in private universities represented 3% of the total, while in 2019 they represented 20%).¹⁰³ Whether or not this trend continues in the future will depend mainly on the ability of the public university to adapt its training options and teaching systems to the needs and desires of the new generations of students (both domestic and overseas). No less decisive will be the ability of these institutions to become requalification centres for the senior population, an issue we address in the next section.

Thirdly, Spain will have to almost double the percentage of people with a higher VT qualification, from 11% today to 17% in 2050 [Fig. 23]. The technological devices and organisational processes we use are becoming more and more complex, which means that in the future our country will need more educated technical, computer, chemical, and health personnel. Taking into account the demographic downturn and our starting position, achieving this target will mean moving from the 290,000 people currently enrolled in higher VT to around 260,000 by 2050. In other words,

it will not be necessary to increase the available supply in terms of places, but it will be necessary to diversify and improve it.

Unlike in the past, in the future, higher education will not only be in the hands of VT institutions and universities. New competitors will emerge for both, especially in the online space. However, there is every reason to believe that they will maintain their hegemony in the educational space, except perhaps for a few short programmes and cutting-edge degrees (e.g. courses on new programming languages).

In addition to improving the levels of coverage in VT and university education, the levels of learning achieved in VT and university must be increased. To achieve this, it will be necessary to optimise education systems, afford centres greater autonomy and flexibility,¹⁰⁴ take advantage of new technologies for teaching and student tracking, and change the funding system so that the incentive for schools is not to have more graduates, but to have graduates with better skills. It will be equally important to strengthen pastoral care, modernise curricula and bring them closer to the real needs of the productive network. We do not know with certainty what these needs will be in the future. It seems clear that the demand for STEM (Science, Technology, Engineering and Mathematics) skills, soft skills (e.g. critical thinking, creativity, leadership) and social skills will grow, while the demand for simple and repetitive physical and cognitive skills that can be easily automated will decrease¹⁰⁵ [see chapter 7].

The rest are all unknowns. Although there are many studies and mathematical models that attempt to do so, the truth is that **it is impossible to accurately predict the type of skills that the labour market of the future will demand.**¹⁰⁶ The key, therefore, is to **develop flexible training models, capable of navigating this uncertainty and focused on increasing the adaptability of workers to new demands.** This means emphasising what Joseph Stiglitz calls “learning to learn, by learning”,¹⁰⁷ also in secondary and tertiary level education; focusing on the acquisition of soft skills such as critical thinking and teamwork; encouraging qualifications related to those activities that will grow in the coming decades (e.g. care, the green transition, technology); developing predictive tools that allow us to improve our capacity to anticipate and provide individuals and institutions with greater guidance with respect to the future;¹⁰⁸ and, as we will see below, implementing requalification systems that can detect and respond quickly to the changing needs of the market.

The task ahead is enormous. The good news is that, contrary to what might appear to be the case, **the crisis brought about by the pandemic provides an opportunity** to set it in motion by aligning opportunities and incentives for all stakeholders (citizens, businesses, governments). The fall in the supply of low-skilled jobs resulting from the adjustment of sectors such as the hotel and catering industry will encourage many young people to continue studying and will foreseeably lead to higher graduation rates in compulsory secondary education, baccalaureate, VT and university studies, as seen during the Great Recession of 2008.¹⁰⁹ If the deficiencies already pointed out are corrected, this situation could help significantly increase the proportion of young people who go on to pursue post-compulsory secondary education and put us in a good position to begin **to reduce the gap between us and the EU-8 when it comes to vocational training.**

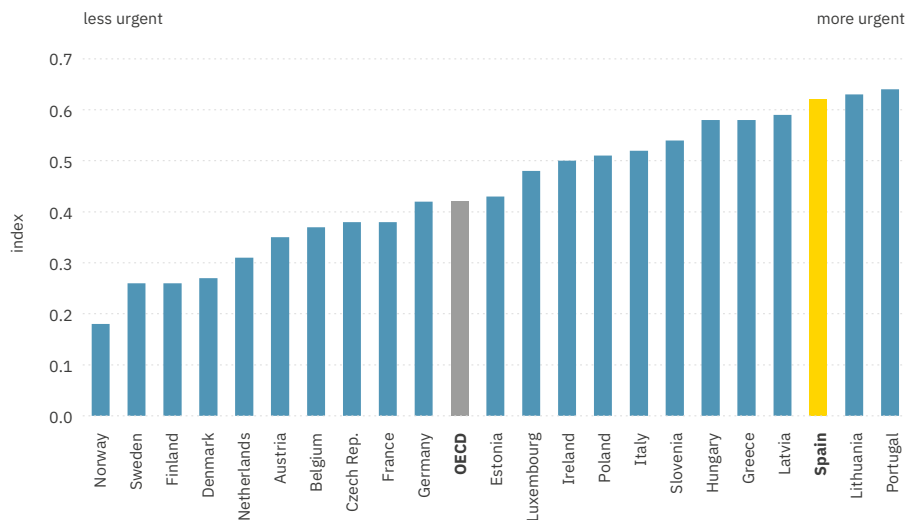
Even more decisive will be the opportunity created by demographic contraction. By 2050, Spain's population aged 16-24 will fall by 200,000 from its level in 2019.¹¹⁰ This means that Spain could double its spending per student on post-compulsory education (from 6,953 euros today to 13,462 euros in Denmark)¹¹¹ by moderately increasing its public spending.¹¹² This injection of financial resources, together with greater efficiency in their use, will enable us to more than pay for the improvements set out in this *Strategy* and thus reap the gains in coverage and learning that the country needs to catch up with the most advanced EU states.

Digitalisation will also provide key support. There are already higher education institutions that use Artificial Intelligence systems to track students' progress, detecting potential drop-outs months in advance and applying the necessary support measures to prevent them from dropping out. This raises important ethical dilemmas, but also opens the door to significant improvements in outcomes.¹¹³ Likewise, there are countries that are beginning to use *big data* to monitor labour market needs in real time and design the best training itineraries for their students¹¹⁴ In Spain, one of the keys will be to commit to online or blended learning (combining face-to-face and remote learning), a format that is still underused in Spain¹¹⁵ and which, if properly used, should allow us to increase the quality, quantity, and flexibility of teaching without incurring large expenses.

II. The challenge of requalifying the active population

The second great challenge the country must overcome in relation to human capital is to implement an integrated and efficient requalification system for the adult population. Between now and 2050, most of the jobs that exist in Spain will change significantly as a result of digitalisation, the energy transition and social and cultural transformations [see Chapters 1 and 7] As a result, skills obsolescence will increase; knowledge acquired in youth will expire

Fig. 25. Countries where the need for requalification is more or less urgent



Source: Drafted by the authors based on data from OECD.¹¹⁶

The crisis caused by coronavirus could be a good opportunity to set up this system of requalification and to promote the culture of lifelong learning that is demanded in these new times. After all, for many workers and companies, the acquisition of new skills and a change of activity will be a *sine qua non* condition for recovery. The equation is simple: if, instead of cutting funding (public and private), we increase it, and adapt the training offer to the real needs of people and companies, the current crisis could turn from being an obstacle into a catalyst for improving human capital, helping us to lay the foundations for the integrated system of requalification that Spain requires.¹¹⁷

In this respect, we seem to have learned from the mistakes of 2008.¹¹⁸ The fact that most large companies have set the requalification of their staff as one of their main priorities by 2022,¹¹⁹ or that the government has made training one of the main pillar of the National Recovery, Transformation and Resilience Plan¹²⁰ is a good illustration of this and gives cause for optimism.

What exactly will it take? Three things: an environment that encourages people over the age of 25 to continue learning; a labour and cultural framework that ensures that employers (public and private), far from penalising, reward this desire among their staff; and work-life balance policies and a flexible training offer that allow this desire to be satisfied.

What scale are we talking about? **What will Spain have to do to maintain an up-to-date workforce?** The lack of data at European and national level prevents the development of accurate models to answer this question. The European Commission recently set the target of **having at least 50% of the adult population (25-64 years old) participating in some form of learning activity (formal or informal) each year by 2025.** According to the information available, in 2016, **in Spain only 30% did so** (compared to 37% in the EU-27 and 51% in the EU-8),¹²¹ the vast majority in informal programmes (private classes, courses, conferences, workshops, seminars) [Fig. 26], so achieving this goal will not be easy.

Fig. 26. Training reported by the adult population (25 – 64) in Spain, 2016.

Adults who participated in a formal activity		9% ¹²²		Adults who participated in a formal activity		37% ¹²³			
Employment status				Employment status					
Part-time		51%		Part-time		68%			
Full time		12%		Full time		11%			
Unemployed		20%		Unemployed		12%			
Other		17%		Other		9%			
Type of activity carried out¹²⁴				Activity provider					
Adult education		2%		Formal education institution (schools, colleges, universities)		14%			
Secondary education or High School		4%		Non-formal education and training institutions (e.g. academies)		13%			
VT		16%		Employers		27%			
Degree or equivalent		18%		Non-commercial institutions that do not have education and training as their main activity (e.g. museums)		9%			
Postgraduate (master's or doctorate)		16%		Non-profit association		6%			
Official language school		25%		Business organisations or chambers of commerce		5%			
Others		19%		Trade unions		3%			
Duration of the activity in hours				Duration of the activity in hours					
Less than 10h		4%		Less than 10h		33%			
Between 11h and 100h		24%		Between 11h and 100h		49%			
More than 100h		46%		More than 100h		10%			
Not applicable		27%		Not applicable		8%			
Modality				Modality					
On-site		69%		On-site		82%			
Distance learning		30%		Distance learning		17%			
Utility		Yes		No		Yes		No	
Helped you to find a job or change jobs		24%		74%		10%		89%	
It has helped him/her to improve his/her performance at work		42%		56%		33%		67%	

Source: Drafted by the authors based on data from the INE (Spanish National Statistics Institute).¹²⁵

It should be borne in mind, on the other hand, that **this target set by the European Commission is not entirely useful**, both because of the gap between the reality reported by respondents and that recorded in official state sources¹²⁶ and because of its imprecise nature, as it does not specify the nature, duration, the level of the training undertaken (which can range from a formal master's degree to a lecture) or the learning acquired (more than half of the people who participated in a formal or informal training activity in 2016 consider that it did not help them either to find a job or to improve their professional performance) [Fig. 26].

In reality, it is not the frequency of participation in training activities that is important, but the extent to which they serve to update the skills of the working population and keep it competitive. So, a more useful way of looking at this issue is to take the rate of self-reported skills obsolescence and project it into the future. In doing so, the data suggest that, **in Spain, more than one million people of working age will see their skills outdated annually.**¹²⁷ **If we are to maintain a competitive workforce, we will need to successfully retrain at least that number every year.** By way of reference, it should be noted that in the 2018/19 academic year there were 1.3 million undergraduate students enrolled in Spanish universities.¹²⁸

The **type of courses** that will be required is very varied. Some people will need additional training (upskilling) to update and expand their existing skills. Others will have to undertake reskilling courses to enable them to move into new sectors or related occupations. In terms of **duration**, this will range from a few days to weeks or months, depending on the sector, occupation, age, previous training, professional situation and aspirations of each individual.

These training opportunities will have to be made available at all levels and especially in third-level education, where the bulk of the demand will be concentrated.¹²⁹ **The best way to meet this demand will be to extend the reach of our VT and university systems.** There is no point in continuing to separate the employed from the unemployed (something that objectifies and isolates the latter), nor in creating duplicate courses for both. **In the future, Spain's adult population (employed and unemployed) will update and broaden their skills by taking programmes offered by universities and VT institutions together.** This will help to improve their learning levels, encourage the return to work of those who are unemployed, and allow greater use to be made of the infrastructure, teaching staff and institutional mechanisms of the public system.

In order to contribute to this process, **VT institutions and universities will have to make a number of changes.** Firstly, to enable new, more flexible and targeted training options that allow adults to update their skills in line with the changing needs of the labour market, while continuing with their professional and personal lives. Secondly, new funding mechanisms, beyond the traditional ones associated with education allocations, must be put in place. Thirdly, to become attractive and welcoming spaces for all age groups.¹³⁰ **If we do things right, by 2050, Spanish professional and university campuses will have as many students over 25 as under.**

Naturally, businesses, public administrations and third sector organisations will also play a key role in the training revolution. It is not for nothing that 86% of Spanish workers believe that they could develop the skills they need for the future through their current employer.¹³¹

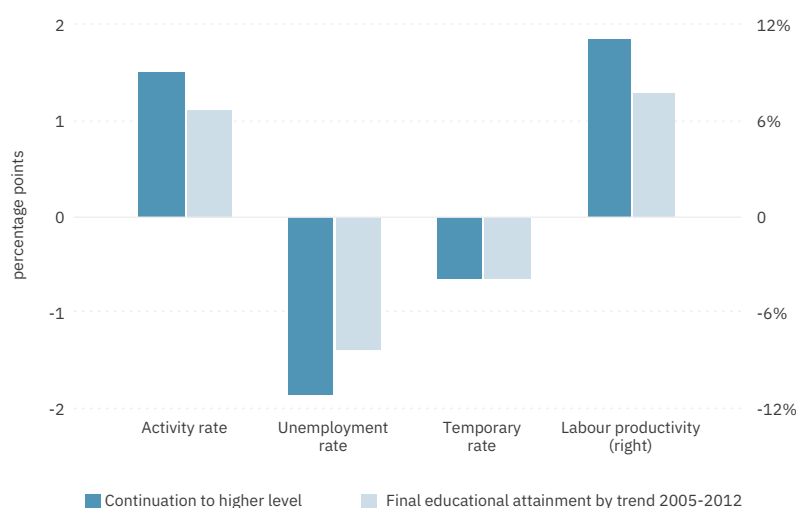
In the coming decades, *megatrends* like **digitalisation and the ecological transition will bring about profound changes in our productive network and will further increase the need for the requalification of the workforce, even for older members.** Think, for example, of a mechanic who repairs and services cars. Until now, their need for requalification has been dictated by the constant but marginal improvements that manufacturers have been introducing in new models. The next few years, however, will see the arrival of the electric car, whose mechanics are completely different. A significant proportion of today's mechanics will need to retrain to be able to work on such vehicles. The same will be true for all sectors and occupations that will be altered by automation or the green transition.¹³²

Demographic ageing will also add additional pressure to the challenge of requalification, and will do so in two ways. On the one hand, it will force companies to transform their human resources strategy. One of the ways in which many companies have dealt with skills obsolescence has been to replace their more senior employees with younger employees who command lower salaries and offer a more up-to-date range of skills. In the coming years, however, the young population (between 25 and 35 years of age) will shrink¹³³ and the competition between companies (domestic and foreign) for the most qualified profiles will increase. **This will make it more difficult to find young replacements and will push companies to retrain their most senior employees**, either through in-company programmes or by making it easier for them to participate in other training programmes. On the other hand, the ageing of the population will lead to an increased demand for care activities and the emergence of new jobs requiring the acquisition of new skills [see chapter 5].

The benefits of taking action

Improving our training and requalification mechanisms for the adult population will have very positive effects on our economy and labour market. For example, **if we were to reduce the percentage of young people leaving school early from the current level of 17% to 3% by 2050** and get everyone to complete at least upper secondary education, **Spain's structural unemployment rate could be reduced by between 1.4 and 1.9 points, and labour productivity could increase by 7.7% to 11.1%** [Fig. 27].

Fig. 27. Potential effect of reducing the early school dropout rate to 3% in Spain



Source: Authors' own, based on Serrano *et al*¹³⁴

Similarly, if we manage to increase the participation of workers in requalification programmes, **the likelihood of their becoming unemployed will be reduced**,¹³⁵ and the likelihood that those who do lose their jobs will find a superior (better paid and more stable) job will increase considerably.¹³⁶

More broadly, **if we manage to improve the quality of our human capital**¹³⁷ to near EU-8 levels by 2050, **Spain could increase its GDP per capita growth by 2 tenths more per year** compared to a baseline scenario, without major reforms¹³⁸ [see chapter 1].

Improving training and requalification systems would also have a very positive impact on the health, civic participation, environmental awareness and life satisfaction of our population, thus becoming a key way of overcoming the other challenges addressed in this *Strategy*.

How can this be achieved? A number of measures are suggested on the following pages.

WHAT SHOULD BE DONE TO ENSURE A WELL-EDUCATED WORKFORCE

Between now and 2050, Spain must **significantly increase the skills of its workforce** if it is to reduce its structural unemployment, develop a competitive and sustainable pattern of economic growth, and converge with the most advanced countries in the EU. **Doing so will involve, firstly, improving the levels of coverage and learning in VT and university education; and, secondly, implementing an integrated system of requalification that allows the adult population to remain trained and updated throughout their professional life.**

It is difficult to achieve that which cannot be measured. It is therefore essential that, in the coming years, our country agrees, through social dialogue, on a **table of measurable indicators and a list of concrete targets** that will allow us to monitor progress and guide the ambitions of these reforms. Here are some suggestions, following the principles outlined in the Introduction to this *Strategy*:

Goal 9. Ensure 93% of the population aged 25-34 has an education beyond secondary school by 2050.

Goal 13. Progressively increase public spending on education to 5.5% of GDP by the middle of the century, ensuring a similar improvement in spending per student. This increase in funding must be accompanied by significant improvements in efficiency and in the composition of spending.

Goal 14. Close the gender gap in vocational training and university degrees, particularly in the STEM subjects.

Goal 15. Ensure the entire adult population has least basic digital skills.

Goal 16. Ensure 75% of the adult population speak at least one foreign language.

Goal 17. Achieve a societal understanding of education as a continuous process that should take place throughout life, from childhood to old age, so that by 2050, 90% of the adult population participates in some kind of requalification programme or activity each year. Particular efforts should be made to target those groups which are currently under-represented in this field.

Goal 18. Progressively increase the participation rate in requalification programmes among the unemployed to at least 70% by 2050.

Goal 19. Increase funding for active labour market policies dedicated to training to 0.25% of GDP by 2030 and 0.4% by 2050.

Goal 20. Substantially increase the percentage of companies (small, medium and large) that provide training for their employees.

Scoreboard and targets

Indicators	Place	Average 2015-2019 or latest data available*	Targets		
			2030	2040	2050
9 Population aged 25-34 with more than lower secondary education ¹³⁹	Spain	70%*	78%	86%	93%
	EU-27	85%*	–	–	–
	EU-8	87%*	–	–	–
13 Public expenditure on education (% of GDP) ¹⁴⁰	Spain	4.3%	5.1%	5.3%	5.5% ¹⁴¹
	EU-27	5.0%	–	–	–
	EU-8	6.1%	–	–	–
14 Female students enrolled in tertiary education in the STEM field (% of total) ¹⁴²	Spain	28%	35%	42%	50%
	EU-27	31%	–	–	–
	EU-8	29%	–	–	–
15 Proportion of adult population (16-74 years old) with at least basic digital skills ¹⁴³	Spain	55%	70% ¹⁴⁴	100%	100%
	EU-27	55%	–	–	–
	EU-8	69%	–	–	–
16 Adult population (25-64 years old) who recognise that they do not speak any foreign languages (% of total) ¹⁴⁵	Spain	46%*	40%	30%	25%
	EU-27	32%*	–	–	–
	EU-8	16%*	–	–	–
17 Proportion of adult population (25-64 years old) who report having taken part in a retraining programme in the last year ¹⁴⁶	Spain	30%*	50% ¹⁴⁷	70%	90%
	EU-27	37%*	–	–	–
	EU-8	51%*	–	–	–
18 Proportion of unemployed population (25-64 years old) with recent learning experience ¹⁴⁸	Spain	32%*	35%	50%	70%
	EU-27	29%*	–	–	–
	EU-8	42%*	–	–	–

Indicators	Place	Average 2015-2019 or latest data available*	Targets			
			2030	2040	2050	
19 Active labour market policies devoted to training (% of GDP) ¹⁴⁹	Spain	0.11%	0.25%	0.30%	0.40%	
	EU-22	0.15%	–	–	–	
	EU-8	0.27%	–	–	–	
20 Percentage of enterprises that carry out training for their employees by size ¹⁵⁰	Spain	92%	95%	100%	100%	
		82%	88%	92%	95%	
		51%	60%	70%	75%	
	Large (+250 employees) Medium (50-249) Small (10-49)	EU-27	n.d.	–	–	–
		EU-8	n.d.	–	–	–

To achieve these goals, Spain will have to undertake **far-reaching reforms and launch ambitious initiatives** on several fronts. Here are some suggestions:

Front 1: Improve results in early childhood, primary and secondary education

Much of our labour force shortages stem from weaknesses in our education system at the levels prior to post-compulsory secondary level. Until these are corrected, our human capital cannot catch up with the EU-8. It is therefore essential to reduce rates of students who are held back a year or dropout, to increase the proportion of people who continue studying beyond the compulsory secondary level, and to improve learning levels in terms of both equality and excellence, following the recommendations set out in Chapter 2 of this *Strategy*.

Along the same lines, it will also be necessary to increase the participation of the adult population in initial and intermediate level studies, and **to develop a national plan aimed at providing the adult population that left school prematurely with a mechanism for acquiring basic educational skills that does not necessarily imply a return to school**, as is the case in most European countries.¹⁵¹

Front 2: Moving towards the creation of an integrated lifelong learning system

Spain needs to better coordinate the different parts that currently make up its training and requalification system in order to overcome the current compartmentalisation and exploit its full potential, and to make the notion of "lifelong learning" the backbone of the whole system. To achieve this, Spain must:

- Improve communication and collaboration between the different institutions (public and private) responsible for the design, implementation and evaluation of training and requalification in Spain, including state, regional and municipal administrations, companies, VT centres, universities, postgraduate schools, academies, and many more.
- Reform access and coordination systems to allow for a greater combination of training mechanisms. The boundaries that currently separate VT, universities and in-company training must be made more flexible, so that people can develop integrated programmes, combining courses from all types of training (e.g. a worker can take subjects from higher VT qualifications and university degrees of their choice, in order to update or broaden

their knowledge in their specific field of interest). This will make it possible to increase and diversify educational options, making them more versatile and increasing the degree of personalisation available.

- To create a technology-based system that allows us to define the present needs and anticipate the future needs of the productive network. To achieve this, it will be necessary to combine the strengths of existing mechanisms¹⁵² with the development of a new information system based on big data and Artificial Intelligence, capable of processing large amounts of data in real time and communicating, in a simple and transparent way: 1) all available information on the skills demanded by companies in the short, medium and long term; 2) the current VT catalogue for acquiring these skills; 3) and an impact assessment on the improvement of employability and professional careers. It is essential that this tool is unique and comprehensive, connecting the different training stakeholders (institutes, universities, VT centres, companies), administrations (national, regional and municipal), and territories (Spain and Europe). Similarly, it will be necessary to facilitate the use of this tool both for the guidance staff of the Public Employment Services and for citizens themselves, so that they can easily use it to identify individualised professional development itineraries that combine employment and training actions. The Skills Match platform,¹⁵³ created by the Australian Department of Education to facilitate the requalification of workers affected by the coronavirus crisis, may be a good example to follow.
- Create more effective and transparent evaluation tools for training and requalification policies to facilitate evidence-based decision-making. Every course funded with public money should be publicly evaluated, so that resources are directed to those that produce good results. The cross-checking and processing of statistical data on training and employment, as well as the analysis of the counterfactual alternative¹⁵⁴ should form the basis of such an evaluation. Furthermore, micro-data should be made available to the scientific community to help them better understand the needs of the Spanish labour market and training system.
- To completely reform the State Public Employment Service (SEPE), providing it with more human and material resources; rationalising and digitalising the management of benefits and its administrative processes; and reinventing its mechanisms for attending to citizens, in order to provide a much more personalised and efficient guidance and support service.

Front 3: Extend, modernise and disseminate lifelong learning mechanisms among the working population

- Recognise the right of all citizens to lifelong learning and the obligation of the state to provide the necessary opportunities for it, as recommended by the United Nations, the International Labour Organisation and many educational institutions. For reference, South Korea¹⁵⁵ and Uruguay can be used as examples.¹⁵⁶ In addition, a National Strategy for Lifelong Learning could be launched, as several countries around the world have already done¹⁵⁷ and a Council for Lifelong Learning could be created within the Department of

Education and Vocational Training, similar to the one in Finland,¹⁵⁸ with the mandate to coordinate such a strategy, promote measures and coordinate multi-sectoral efforts.

- Expand¹⁵⁹ and improve the training options offered by the public sector to the adult population. This should be done mainly through the creation of new degrees within the framework of VT and public universities. These new degrees will generally be shorter and more specific than undergraduate and postgraduate degrees, responding to the specific needs of the productive network and to those areas that will experience greater growth in the coming years. At the same time, it should be possible to split or combine training flexibly, facilitating work and family life. For the latter, a blended format (combining face-to-face and distance learning) will be essential.
- At the same time, the role of companies as training providers should be strengthened through incentives such as the possibility of accrediting their training and combining it with courses offered by universities and VT centres.
- Encourage the contribution of companies, trade unions, employers' organisations and other social partners in the design and development of the training programmes provided by the State and the Autonomous Communities, following the example of other European countries¹⁶⁰ or Autonomous Communities such as Catalonia.
- Increase funding for active employment policies and include a complementary funding item in the General State Budget to correct for variations in company quotas, so that workforce training is not so much at the mercy of the economic cycle and funds are not cut in times of recession, when they are most needed.
- Support the increase of continuous training among workers in micro-enterprises, small companies and the self-employed, through incentives and actions defined by sector and territory, with the support of both the social stakeholders and the integrated VT system centres.
- Modernise and expand the Spanish system for the assessment and accreditation of professional competences acquired through work experience and informal channels. This should be done referencing the guidelines established by the EU¹⁶¹ and following examples such as those of the Basque Country,¹⁶² France,¹⁶³ and Norway.¹⁶⁴
- Promote participation of the active working population in requalification programmes in response to personal concerns and strategic needs identified by companies and public administrations. To this end, mechanisms such as the Individual Training Permit (PIF) should be further developed and the creation of training incentives or vouchers should be explored, following successful models such as France's *Compte personnel de formation* or Singapore's *SkillsFuture*¹⁶⁵ Moreover, guidance systems should be strengthened, mechanisms should be included in employment legislation to provide incentives and

- Promote the participation in training of currently under-represented groups: women in sectors such as industry and technology, men in sectors such as care services, the over-55s in lifelong learning, and adults with medium-low qualifications and/or educational levels.
- Create a temporary mobility plan for workers that allows employees to complete professional exchanges in other parts of Spain, acquiring new skills and best practices and weaving inter-territorial collaboration networks. Two interesting European examples are the Eures¹⁶⁶ and Erasmus+ programmes.¹⁶⁷
- Launch campaigns to raise awareness to help the adult population understand the importance of lifelong learning and to provide information on the different options and tools available. Spain needs a "culture of lifelong learning".

Front 4: Adapting and strengthening the vocational training model

The government has launched an ambitious plan for the modernisation of VT that aims to correct many of the shortcomings detected.¹⁶⁸ In addition to the measures contemplated in this plan, we suggest the following:

- Adapt training options to better meet current and future needs, modernising curricula and incorporating formal qualifications, certifications and other accreditations associated with uncovered demands and emerging sectors [see chapter 1] such as the digitalisation of the economy, the green transition, or long-term care services.
- Promote the development of distance and blended VT courses (combining face-to-face and online training), paying special attention to the potential demand from rural areas.
- Improve the mechanisms of professional and vocational guidance, providing guidance counsellors with better tools and skills through training and specific courses, so that they can provide the support that job seekers deserve and require. It is important that this training helps mitigate existing gender biases and is well coordinated with the SEPE (State Public Employment Service) and the private sector.
- Establish a regulatory framework that encourages the development of dual VT projects. This will require encouraging SME participation by easing administrative requirements, supporting the business mentor/trainer, and providing tax incentives. Greater participation of the adult population in dual VT programmes should also be encouraged as a way of training and accrediting low-skilled people, following the model developed in countries such as Austria and Finland.¹⁶⁹

Front 5: Bringing the university closer to the productive fabric

- To reduce the gulf between the university degrees most in demand by students and those most in demand by employers, encouraging students to take those with the greatest employment opportunities, through grants and guidance programmes.
- Updating degree curricula to make them less academic and more oriented towards the development of the skills that graduates will require in their professional lives. In many cases, this will not mean seeking greater specialisation but, rather, the opposite: adopting a more generalist approach that encourages the acquisition of soft competences such as written comprehension, verbal communication or critical thinking, which help to develop more versatile profiles, mitigate obsolescence and increase people's employability¹⁷⁰.
- Incorporate employability¹⁷¹ rates into the universities' evaluation, funding and incentive system. When making this assessment, corrective factors such as the socio-economic background of the graduates (e.g. groups at risk of exclusion find it more difficult to find a job) and the quality and type of employment obtained should be taken into account.
- Strengthen the provision of adult education by universities. This means creating new qualifications and training formats, but also improving their accessibility, so that they can be made compatible with the work and family obligations of many adults.
- Establish closer links between universities and the productive network. These links must work both ways: universities must try to adapt their content to market demands, but business must also become more involved in the funding and co-governance of education institutions.

If Spain succeeds in these transformations, it will be in a position to maintain an up-to-date and competitive workforce and reap the productivity gains it needs to consolidate its position as one of the most advanced countries in Europe.

CHALLENGE #3: IMPROVE TRAINING AND RE-SKILLING OF OUR POPULATION

¹ Carreras, Albert, and Xavier Tafunell (coords). *Estadísticas históricas de España: siglos XIX-XX*. Fundación BBVA, 2005. https://www.fbbva.es/wp-content/uploads/2017/05/dat/DE_2006_estadisticas_historicas.pdf.

² De la Fuente, Ángel, and Rafael Doménech. “El nivel educativo de la población en España y sus regiones: 1960-2011.” *Investigaciones Regionales – Journal of Regional Research* 34, 2016. http://www.aecr.org/images/ImatgesArticles/2016/5/04_DELAFUENTE.pdf.

³ Official State Gazette. *Spanish Constitution Art. 27 y 40*. Madrid, 1978. [https://www.boe.es/eli/es/c/1978/12/27/\(1\)/con](https://www.boe.es/eli/es/c/1978/12/27/(1)/con).

⁴ In 2018, vocational training accounted for 42% of job vacancies in Spain, while university education accounted for 38%. For further details, see: Adecco. *Informe Infoempleo Adecco: Oferta y Demanda de Empleo en España*. Madrid, 2019. <https://cdn.infoempleo.com/infoempleo/documentacion/Informe-infoempleo-adecco-2019.pdf>; Bentolila, Samuel, Antonio Cabrales, and Marcel Jansen. “Does Dual Vocational Education Pay Off.” *OECD Employment, Labour and Social Affairs Department*, Paris: OECD Publishing, 2019. <https://www.oecd.org/employment/emp/OECD-ELS-Seminars-SBentolila.pdf>.

⁵ Prior to the current intermediate and higher level Training Cycle, there was the auxiliary technician (FP I) and specialist technician (FP II) qualifications. These vocational training qualifications were modified in the Ley Orgánica 1/1990, de 3 de octubre, de Ordenación General del Sistema Educativo. For further details, see: Official State Gazette. *Ley Orgánica 1/1990, de 3 de octubre, de Ordenación General del Sistema Educativo*. Madrid, 1990. <https://www.boe.es/eli/es/lo/1990/10/03/1>; and Department of Education and Vocational Training. *Alumnado de Ciclos Formativos de FP Básica/FP Grado Medio/FP Grado Superior por titularidad del centro, comunidad autónoma y curso académico*. <http://estadisticas.mecd.gob.es/EducaDynPx/educabase/index.htm?type=pcaxis&path=/Educacion/Alumnado/Matriculado/Series20/SeriesAlumnado&file=pcaxis&l=s0>.

⁶ Universitas 21, the other ranking available, places us in 23rd position in the world and 10th position in the EU-27. See: U21. *Ranking of National Higher Education Systems*. https://universitas21.com/sites/default/files/2020-04/U21_Rankings%20Report_0320_Final_LR%20Single.pdf.

⁷ The 1980 figure comes from García López and Simancas González and the 2018 figure, from the Department of Universities. For further details, see: García López, Marcial, and Esther Simancas González. “Historia de un secuestro: de la Iglesia a la Marca. Evolución histórica de la universidad en España.” *Chasqui*, n.º 133, 2016. <https://doi.org/10.16921/chasqui.v0i133.2953>; and Department of Universities. *Datos y cifras del Sistema Universitario Español - Publicación 2019-2020*. Madrid, 2020. https://www.ciencia.gob.es/stfls/MICINN/Universidades/Ficheros/Estadisticas/Informe_Datos_Cifras_Sistema_Universitario_Espanol_2019-2020.pdf.

⁸ Fundación Conocimiento y Desarrollo. *Informe CYD 2018*. Barcelona, 2019. https://www.upo.es/diario/wp-content/uploads/2019/09/ICYD-2018_completo.pdf.

⁹ For further details on the construction of the see the *Methodological note* number 1.

¹⁰ QS Top Universities. “Higher Education System Strength Ranking.” QS Top Universities, <https://www.topuniversities.com/system-strength-rankings/2018>.

¹¹ The *Shanghai ranking* ranks universities on several indicators of academic or research performance, including alumni and staff winning Nobel Prizes and Fields Medals, most cited researchers, articles published in journals such as Nature or Science, articles indexed in major citation indexes, and the institution's per capita academic performance. For further details, see: Academic Ranking of World Universities. “Number of Universities in top 1000 by country in 2020.” Academic Ranking of World Universities, <http://www.shanghairanking.com/ARWU2020.html>; World Bank. *Total Population*. <https://data.worldbank.org/>; and Eurostat. *Population on 1 January 2020 [tps00001]*. <https://ec.europa.eu/eurostat/data/database>.

¹² Rahona, Marta Mercedes. “La educación universitaria en España y la inserción laboral de los graduados en la década de los noventa. Un enfoque comparado.” *Madrid, Premios Injuve para Tesis Doctoral*, 2008. <https://issuu.com/injuve/docs/premiotesis2008>.

¹³ Department of Education and Vocational Training. *Anuario Estadístico. Las cifras de la educación en España en el curso 1996-1997 y 2017-2018: Las becas y ayudas a la educación. Becarios y becas concedidas en enseñanza universitaria por Universidad*. <https://www.educacionyfp.gob.es/servicios-al-ciudadano/estadisticas/indicadores/cifras-educacion-espana.html>.

¹⁴ In 1977, Spanish universities enrolled a total of 689,971. In 2019, this number was 1,633,358. For further data, see: Bricall, Josep M. *Informe Universidad 2000*. 2000. https://www.observatoriuniversitari.org/es/files/2014/05/Bricall_JM-2000-Informe-Universidad-2000.pdf; and Department of Education and Vocational Training. *Matriculados por tipo y modalidad de la universidad, nivel de estudio, sexo y rama de enseñanza*. http://estadisticas.mecd.gob.es/EducaDynPx/educabase/index.htm?type=pcaxis&path=/Universitaria/Alumnado/Nueva_Estructura/Serie/TotalSUE/&file=pcaxis.

¹⁵ See, for example: World Economic Forum. *The Global Human Capital Report 2017: Preparing People for the Future of Work*. Geneva, 2017. http://www3.weforum.org/docs/WEF_Global_Human_Capital_Report_2017.pdf; and US News. “Best Countries Survey.” US News, <https://www.usnews.com/news/best-countries/data-explorer>.

¹⁶ Bentolila, Samuel, Florentino Felgueroso, Marcel Jansen, and Juan F. Jimeno. “Lost in Recession: Youth Employment and Earnings in Spain.” *FEDEA, Estudios sobre la Economía Española*, n.º 2021/12, 2021. <http://documentos.fedea.net/pubs/eee/eee2015-24.pdf>.

¹⁷ Salguero, José Luis. “Historia de la Formación continua en España.” AENOA Congreso Virtual, <https://congresosdeformacion.com/2016/10/04/historia-de-la-formacion-continua-en-espana/>.

¹⁸ Homs, Oriol. “La formación profesional en España: Hacia la sociedad

del conocimiento." *Obra Social, Fundación "La Caixa"*, 2008. <https://www.todofp.es/dam/jcr:31fb7120-ffd4-4e07-a025-cc9041be7830/informe-caixa-version-noviembre-2012-pdf.pdf>.

¹⁹ Public expenditure on active training policies went from 0.03% in 1985 to 0.11% in 2018. For further details, see: OECD. *Public expenditure and participant stocks on LMP - Training as a percentage of GDP*. <https://stats.oecd.org/>.

²⁰ The budget for training for the employed has increased from 110 million in 1993 to 1,142 million in 2019. There were 197,980 participants in 1993 and 4,776,684 in 2019, of which a small proportion (40,421) were unemployed. There were 18,550,726 hours of training delivered in 1993 and 75,486,464 in 2019. For further details, see: FUNDAE. *Serie estadísticas de participantes en formación y empresas formadoras*. <https://www.fundae.es/publicaciones/series-estadisticas>; FUNDAE. *Formación histórica (I-III ANFC y Acciones Complementarias)*. <https://www.fundae.es/publicaciones/sintesis-estadisticas?filterType=7,8,9,10>; FUNDAE. *Formación para el empleo. Balance de situación 2019*. Madrid, 2020. <https://www.fundae.es/docs/default-source/publicaciones-y-evaluaciones/publicaciones-estadistica/balance-de-situacion-2019.pdf>; and FUNDAE. *Indicadores históricos. Formación en el empleo. 1993- 2017*. Madrid, 2018. https://www.fundae.es/docs/default-source/publicaciones-y-evaluaciones/informes-y-balances/balance-20de-20resultados-201993_2017.pdf.

²¹ Data up to 2003 are obtained from FUNDAE's historical training database, while from 2004 onwards the most recent FUNDAE statistical series are used. It should be noted that these courses do not only include employees; a small part may also include training courses for the unemployed. In addition, a person may have participated in different courses and therefore be counted more than once. For further details, see: FUNDAE. *Serie estadísticas de participantes en formación y empresas formadoras*. <https://www.fundae.es/publicaciones/series-estadisticas>; and FUNDAE. *Formación histórica (I-III ANFC y Acciones Complementarias)*. <https://www.fundae.es/publicaciones/sintesis-estadisticas?filterType=7,8,9,10>.

²² Homs, Oriol. "La formación profesional en España: Hacia la sociedad del conocimiento." *Obra Social, Fundación "La Caixa"*, 2008. <https://www.todofp.es/dam/jcr:31fb7120-ffd4-4e07-a025-cc9041be7830/informe-caixa-version-noviembre-2012-pdf.pdf>.

²³ Barro, Robert, and Jong-Wha Lee. "A New Data Set of Educational Attainment in the World, 1950-2010." *Journal of Development Economics* 104, 2013. <https://www.nber.org/papers/w15902>; and United Nations. Human Development Report 2018 Statistical Update. <http://hdr.undp.org/en/2018-update>.

²⁴ De la Fuente, Ángel, and Rafael Doménech. "El nivel educativo de la población en España y sus regiones: 1960-2011." *Investigaciones Regionales – Journal of Regional Research* 34, 2016. http://www.aecr.org/images/ImatgesArticles/2016/5/04_DELAFUENTE.pdf.

²⁵ When these data are disaggregated by gender, there are differences between men and women. For men, the proportion of those born in the 1940s with a tertiary degree was 20% and among those born in the 1980s, it was 41%. The increase for women was even more pronounced, from 13% to 52% for the same birth years. For further details, see: Department of Education and Vocational Training. *Explotación de las variables educativas de la encuesta de población*

activa / nivel de formación de la población. Población de 25-64 años por grupo de edad, comunidad autónoma, sexo, nivel de formación y año. <http://estadisticas.mecd.gob.es/EducaDynPx/educabase/index.htm?type=pcaxis&path=/laborales/epa/nivfor&file=pcaxis&l=s0>.

²⁶ The EU-8 average is constructed as the simple average of the values of the individual countries. For further details, see: OECD. *OECD Skills Outlook 2013. First results from the Survey of Adults Skills Figure 3.2 (L)*. Paris: OECD Publishing, 2013. [https://www.oecd.org/skills/piaac/Skills%20volume%201%20\(eng\)--full%20v12--eBook%20\(04%2011%202013\).pdf](https://www.oecd.org/skills/piaac/Skills%20volume%201%20(eng)--full%20v12--eBook%20(04%2011%202013).pdf).

²⁷ The EU-8 and EU-27 are constructed as the simple average of the values of the individual countries. The human capital index calculates the contributions of health and education to worker productivity. The index score ranges from zero to one. For data, see: World Bank. *The Human Capital Index 2020 Update: Human Capital in the Time of COVID-19*. Washington D.C., 2020. <http://hdl.handle.net/10986/34432>. Similar results in: World Economic Forum. *The Global Human Capital Report 2017: Preparing People for the Future of Work*. Geneva, 2017. http://www3.weforum.org/docs/WEF_Global_Human_Capital_Report_2017.pdf.

²⁸ The EU-8 and EU-22 are constructed as the simple average of the values of the individual countries. The EU-22 consists of the EU-27 member countries that are also members of the OECD, which excludes Bulgaria, Croatia, Cyprus, Malta and Romania. Three levels of education are represented in the graph: i) higher education which includes short post-secondary education (vocational or post-secondary non-tertiary certificates and short-cycle higher or tertiary vocational training), bachelor degree or equivalent, master's degree or equivalent and doctorate; ii) upper secondary education which includes high school, intermediate level vocational training, access course to intermediate level vocational training, basic vocational training and other equivalents; and iii) lower than second stage of secondary education which contains less than primary education, primary education and first stage of secondary education. See: INE. "Clasificación Nacional de Educación 2014. CNED-2014. Clasificación de programas, titulaciones y certificaciones en niveles de formación alcanzados (CNED-A): Estructura." INE, https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736177034&menu=ultiDatos&idp=1254735976614; and OECD. *Educational attainment and labour-force status y Population data*. <https://stats.oecd.org/>.

²⁹ The percentage of people not completing upper secondary education in Spain is high both among the 55-64 age group (over 60%) and among the younger 25-34 age group (the only country above 30% in the OECD except for Turkey). See figure 2.3 in: OECD. *Skills Matter: Further Results from the Survey of Adult Skills*. Paris: OECD Publishing, 2016. <https://doi.org/10.1787/9789264258051-en>.

³⁰ "Who do not have any vocational training qualification" means that they have only primary or secondary general education (secondary education and high school).

³¹ The figure corresponds to the year 2019. For further details, see: INE. *Encuesta de población activa. Activos por nivel de formación alcanzado, sexo y grupo de edad*. https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176918&menu=resultados&secc=1254736195129&idp=1254735976595#Itabs-1254736195129.

³² The reading comprehension data are taken from Figure 3.2. and the mathematical comprehension data, from table A3.2 (N) of the report mentioned below. The EU-8 and EU-22 have been constructed as the simple average of the values of the individual countries. The EU-22 consists of the EU-27 member countries that are also members of the OECD. In the case of reading literacy, the EU-22 does not include Hungary, Latvia, Luxembourg and Portugal due to lack of data. For its part, the EU--22 of mathematical comprehension does not include Latvia, Luxembourg and Portugal for the same reason. For further details, see: OECD. *Skills Matter: Further Results from the Survey of Adult Skills*. Paris: OECD Publishing, 2016. <https://doi.org/10.1787/9789264258051-en>.

³³ According to the Adult Education Survey (AES), in 2016, 46% of the Spanish active population did not know any foreign language, one of the worst results among European countries. This is not exclusive to the over-55s, but affects young people between 25 and 34 almost as strongly. See: Eurostat. *Number of foreign languages known (self-reported) by labour status [edat_aes_l24]*. <https://ec.europa.eu/eurostat/data/database>. Other studies such as the *EF English Proficiency Index* or CIS (Anuario CIS 2016, p. 317), confirm these figures. It is estimated that 60% of our adults have no knowledge of the language, well below the EU-8 countries. The *EF English Proficiency Index* 2019 places Spain, along with Italy, at the bottom of European countries in terms of English proficiency. See: Centro de Investigaciones Sociológicas. *Anuario CIS 2016*. Madrid: Catalogo de Publicaciones de la Administración Central del Estado, 2017. <https://libreria.cis.es/libros/anuario-cis-2016/9788474767346/>; y Education First. *EF EPI: Índice EF de nivel de inglés*. 2019. <https://www.ef.com.es/assetscdn/WIBIwq6RdJvcD9bc8RMd/legacy/~/media/centralefcom/epi/downloads/full-reports/v9/ef-epi-2019-spanish-euro.pdf>.

³⁴ The European Commission's Digital Economy and Society Index (DESI) ranks Spain in a good position in terms of connectivity (broadband coverage) or digitalisation of public services, but does not perform as well in terms of digital technology integration (e-commerce or digitalisation of companies), where it scores at the EU average (41.3/100). Spain's worst score (47.5/100) is in competences in the use of the Internet or other advanced skills that make up the human capital index, below the EU average (49.3/100) and well below the average of the EU-8 countries (60.8/100). See: European Commission. *Digital Economy and Society Index (DESI)*. <https://digital-agenda-data.eu/datasets/desi>^{<?>}

³⁵ On this matter, see: Bhutoria, Aditi, John Jerrim, and Anna Vignoles. "The financial skills of adults across the world. New estimates from PIAAC." 2018. https://johnjerrim.files.wordpress.com/2018/03/piaac_working_report_march_2018.docx; and Klapper, Leora, Annamaria Lusardi, and Peter van Oudheusden. *Financial Literacy Around the World: Insights From The Standard & Poor's Ratings Services Global Financial Literacy Survey*. Washington D.C.: Standard & Poor's, 2015. https://responsiblefinanceforum.org/wp-content/uploads/2015/12/2015-Finlit_paper_17_F3_SINGLES.pdf.

³⁶ Rubio, Diego. "Transferable skills to tackle education obsolescence and foster innovation." *European Commission, Science, Research and Innovation Performance of the EU*. 2018. https://ec.europa.eu/info/sites/info/files/srip-report-chap-1-3_2018_en.pdf.

³⁷ The values for each indicator correspond to the quintiles of EU

countries' skill levels available (1 for countries with the lowest levels, 5 for countries with the highest levels). See: World Economic Forum. *New Vision for Education: Unlocking the Potential of Technology*. Geneva, 2015. http://www3.weforum.org/docs/WEFUSA_NewVisionforEducation_Report2015.pdf.

³⁸ OECD. *Skills for Jobs Mismatch [mismatch]*. <https://stats.oecd.org/>.

³⁹ Proportion of employers with less than primary or primary and secondary education. See: Eurostat. *Self-employment by sex, age and educational attainment level [edat_lfse_03]*. <https://ec.europa.eu/eurostat/data/database>. Quizá por ello, algunos estudios sitúan a los cuadros directivos españoles a la cola de las grandes economías de Europa en su capacidad de liderazgo y gestión empresarial. See, for example: Banco de España. *Informe Anual 2015*. 2015. <https://www.bde.es/ff/webbde/SES/Secciones/Publicaciones/PublicacionesAnuales/InformesAnuales/descargar/15/Fich/inf2015.pdf>; and World Management Survey. *Management Matters: Manufacturing Report 2014*. 2014. <https://cdnstatic8.com/worldmanagementsurvey.org/wp-content/images/2015/06/Manufacturing-Report-2014-EUROPE-ENGLISH.pdf>.

⁴⁰ Manpower. *2018 Talent Shortage Survey*. 2018. <https://go.manpowergroup.com/talent-shortage-2018#thereport>.

⁴¹ See: Almeida, Rita, and Pedro Carneiro. "The return to firm investments in human capital." *Labour Economics* 16, n.º 1, 2009. <https://doi.org/10.1016/j.labeco.2008.06.002>; Brunello, Giorgio, Simona Lorena Comi, and Daniela Sonedda. "Training Subsidies and the Wage Returns to Continuing Vocational Training: Evidence from Italian Regions." *Labour Economics* 19, n.º 3, 2012. <https://doi.org/10.1016/j.labeco.2012.03.002>; CEDEFOP. *The impact of vocational education and training on company performance*. Luxembourg: Publications Office of the European Union, 2011. <https://doi.org/10.2801/37083>; Dostie, Benoit. "Estimating the returns to firm-sponsored on-the-job and classroom training." *Journal of Human Capital* 7, n.º 2, 2013. <https://doi.org/10.1086/671186>; and Zwick, Thomas. "Continuing Vocational Training Forms and Establishment Productivity in Germany." *German Economic Review* 6, n.º 2, 2005. <https://doi.org/10.1111/j.1465-6485.2005.00125.x>.

⁴² See: Dorsett, Richard, Silvia Lui, and Martin Weale. "Economic Benefits of Lifelong Learning." *Centre for Learning and Life Chances in Knowledge Economies and Societies (LLAKES) Research Paper*, n.º 13, 2010. <https://www.llakes.ac.uk/sites/default/files/DorsettLuiWealeComplete.pdf>; Richardson, Katarina, and Gerard J. van den Berg. "Duration Dependence Versus Unobserved Heterogeneity In Treatment Effects: Swedish Labor Market Training And The Transition Rate To Employment." *Journal of Applied Economics* 28, n.º 2, 2012. <https://doi.org/10.1002/jae.2263>; and Stenberg, Anders. "Comprehensive Education for the Unemployed: Evaluating the Effects on Unemployment of the Adult Education Initiative in Sweden." *Labour* 19, n.º 1, 2005. <https://doi.org/10.1111/j.1467-9914.2005.00293.x>.

⁴³ See: *Blanden, Jo, et al.* "Measuring the Returns to Lifelong Learning", *Economics of Education Review* 31, n.º 4, 2012. <https://doi.org/10.1016/j.econedurev.2011.12.009>; Brunello, Giorgio, Simona Lorena Comi, and Daniela Sonedda. "Training Subsidies and the Wage Returns to Continuing Vocational Training: Evidence from Italian Regions." *Labour Economics* 19, n.º 3, 2012. <https://doi.org/10.1016/j.labeco.2012.03.002>; Dearden, Lorraine, et al. "The returns to academic

and vocational qualifications in the Britain.” *Bulletin of Economic Research* 54, n.º 3, 2002. <https://doi.org/10.1111/1467-8586.00152>; Vignoles, Anna, Augustin De Coulon, and Oscar Marcenaro-Gutierrez. “The Value of Basic Skills in the British Labour Market.” *Oxford Economic Papers* 63, n.º 1, 2011. <https://doi.org/10.1093/oep/gpq012>; Vignoles, Anna, Fernando Galindo-Rueda, and Leon Feinstein. “The Labour Market Impact of Adult Education and Training: A Cohort Analysis.” *Scottish Journal of Political Economy* 51, n.º 2, 2004. <https://doi.org/10.1111/j.0036-9292.2004.00306.x>; and What Works Center for Local Economic Growth. *Evidence Review 1: Employment Training*. 2016. https://whatworksgrowth.org/public/files/Policy_Reviews/16-06-15_Employment_Training_Update.pdf.

⁴⁴ At the European level, the results of these strategies have also been limited. *European progression in Lifelong Learning* has stagnated for a decade, and right now there are only 8 member states that will reach the target of 15% of adults participating in lifelong learning set by the Commission for 2020. The rest are in danger of falling behind and losing their competitive advantage over the US. and Asian rivals. See: European Commission. *An in-depth analysis of adult learning policies and their effectiveness in Europe*. Electronic Platform for Adult Learning in Europe (EPALE), 2015. <https://epale.ec.europa.eu/en/resource-centre/content/depth-analysis-adult-learning-policies-and-their-effectiveness-europe>; and Lifelong Learning Platform (LLL). *Feasibility Study for National Lifelong Learning Platforms*. 2018. http://lllplatform.eu/lll/wp-content/uploads/2018/09/FeasibilityStudy_COMPLETE.pdf.

⁴⁵ See: European Commission. “Política europea de cooperación (marco ET 2020).” European Commission, https://ec.europa.eu/education/policies/european-policy-cooperation/et2020-framework_es; European Commission, *An in-depth analysis of adult learning policies and their effectiveness in Europe*. Electronic Platform for Adult Learning in Europe (EPALE), 2015. <https://epale.ec.europa.eu/en/resource-centre/content/depth-analysis-adult-learning-policies-and-their-effectiveness-europe>; and Lifelong Learning Platform (LLL). *Feasibility Study for National Lifelong Learning Platforms*. 2018. http://lllplatform.eu/lll/wp-content/uploads/2018/09/FeasibilityStudy_COMPLETE.pdf.

⁴⁶ The EU-8 average is constructed as the simple average of the values of the individual countries. For further details, see: OECD. *Survey of Adult Skills (PIAAC) (2012, 2015)*. <http://www.oecd.org/skills/piaac/publicdataandanalysis/>.

⁴⁷ The EU-8 is constructed as the simple average of the values of the individual countries, and the EU-27 is the aggregate indicator reported by Eurostat. For further details, see: Eurostat. *Participation rate in education and training by age [TRNG_AES_101]*. <https://ec.europa.eu/eurostat/data/database>.

⁴⁸ The following document highlights three key factors to explain the different levels of business productivity: worker skills, business management and the ability to innovate. See: Syverson, Chad. “What Determines Productivity?” *Journal of Economic Literature* 49, n.º 2, 2011. <https://doi.org/10.1257/jel.49.2.326>.

⁴⁹ CEDEFOP. “Learning and Innovation in Enterprises.” Luxembourg: Publications Office of the European Union, Research Note, n.º 27, 2012. https://www.cedefop.europa.eu/files/5527_en.pdf.

⁵⁰ The data are revealing. In Spain, 48% of the total of almost 23 million adults in the active population have a level of education that

does not qualify them professionally. If we examine the people who applied for jobs in Spain between 2014 and 2019, this percentage rises to 75% (SEPE calculation). See: Brian, Keeley. *Human Capital: How What You Know Shapes Your Life*. Paris: OECD Publishing, 2017. <http://www.oecd.org/insights/humancapitalhowwhatyouknowshapesyourlife.htm>; Department of Education and Vocational Training. *Plan de Modernización de la Formación Profesional*. Madrid, 2020. https://www.lamoncloa.gob.es/serviciosdeprensa/notasprensa/educacion/Documents/2020/220720-Plan_modernizacion_FP.pdf; and OECD. *Education at a Glance 2019*. Paris: OECD Publishing, 2019. <https://doi.org/10.1787/f8d7880d-en>.

⁵¹ Broecke, Stijn. “Do skills matter for wage inequality?” *IZA World of Labor*, n.º 232, 2016. <https://doi.org/10.15185/izawol.232>.

⁵² See: Sianesi, Barbara, and John Van Reenen. “The Returns to Education: Macroeconomics.” *Journal of Economic Surveys* 17, n.º 2, 2003. <https://doi.org/10.1111/1467-6419.00192>; and OECD. *The OECD Skills Outlook, 2013*. Paris: OECD Publishing, 2013. [http://www.oecd.org/skills/piaac/Skills%20volume%201%20\(eng\)--full%20v12-eBook%20\(04%2011%202013\).pdf](http://www.oecd.org/skills/piaac/Skills%20volume%201%20(eng)--full%20v12-eBook%20(04%2011%202013).pdf).

⁵³ See: Digby, Cynthia L. B. “The Influences of Socio-Demographic Factors, and Non-Formal and Informal Learning Participation on Adult Environmental Behaviors” *International Electronic Journal of Environmental Education* 3, n.º 1, 2013. <https://files.eric.ed.gov/fulltext/EJ1104862.pdf>; and Lipset, Seymour Martin. *Political Man: The Social Bases of Politics*. Garden City, NY: Anchor, 1960.

⁵⁴ See: Yao, Yao, *et al.* “Human Capital and Energy Consumption: Evidence from OECD Countries.” *Energy Economics* 84, 2019. <https://doi.org/10.1016/j.eneco.2019.104534>; and Sianesi, Barbara, and John Van Reenen. “The Returns to Education: Macroeconomics.” *Journal of Economic Surveys* 17, n.º 2, 2003. <https://doi.org/10.1111/1467-6419.00192>.

⁵⁵ In fact, their graduates today have employability and personal satisfaction rates that are often equal to or higher than those of university graduates. In 2018, vocational training accounted for 42% of job vacancies in Spain, while university education accounted for 38%. For further details, see: Adecco. *Informe Infoempleo Adecco: Oferta y Demanda de Empleo en España*. Madrid: Adecco, 2019. <https://cdn.infoempleo.com/infoempleo/documentacion/Informe-infoempleo-adecco-2019.pdf>. See also: Bentolila, Samuel, Antonio Cabrales, and Marcel Jansen. “Does Dual Vocational Education Pay Off?” Presented in: OCDE Employment, Labour and Social Affairs Department, Paris, 27 November 2019. <https://www.oecd.org/employment/emp/OECD-ELS-Seminars-SBentolila.pdf>.

⁵⁶ The early school leaving rate differs by gender. For example, in 2019, this rate in Spain was 21% for men and 13% for women. The EU-8 is constructed as the simple average of the values of the individual countries, and the EU-27 is the aggregate indicator reported by Eurostat. For further details, see: Eurostat. *Early leavers from education and training by sex and labour status [edat_ifse_14]*. <https://ec.europa.eu/eurostat/data/database>.

⁵⁷ The EU-8 average is constructed as the simple average of the values of the individual countries. For further details, see: Eurostat. *Distribution of pupils and students enrolled in general and vocational programmes by education level and NUTS2 regions [educ_uoe_enra13]*. <https://>

ec.europa.eu/eurostat/data/database.

⁵⁸ When the Ley General de Educación (General Education Law) introduced compulsory schooling in General Basic Education (the popular EGB) until the age of 14, and relegated vocational training to a natural outlet for those students who, due to insufficient academic results, could not access the Bachillerato Unificado Polivalente (BUP) (post-compulsory secondary education). For further details, see: Official State Gazette. *Ley Orgánica 14/1970, de 4 de agosto de, General de Educación y Financiamiento de la Reforma Educativa*. Madrid, 1970. <https://www.boe.es/boe/dias/1970/08/06/pdfs/A12525-12546.pdf>.

⁵⁹ Several are detected in this regard: 1) an excessively rigid degree structure that leaves students with little choice; 2) an excessively slow and bureaucratised process of updating curricula and accreditation that prevents a rapid response to technological and socio-economic transformations; 3) a shortage of well-trained teachers, especially in STEM content; 4) a training system that is difficult to reconcile with work and family obligations, which discourages the participation of active workers; and 5) poor coordination between vocational training and universities, which does not allow the dual hybrid training itinerary of vocational training as an access route to university and vocational training as a specialisation route for university graduates to be exploited to its full potential.

⁶⁰ Although the total number of women and men choosing vocational training in Spain is similar, there is a notable difference depending on the qualifications. Four out of every five women in intermediate level vocational education and training are concentrated in four very specific vocational families: Health (36%), Administration (20%), Socio-cultural and community services (13%), and Personal image (11%). Except in the case of Administration, in all of them they account for 80% or more of the enrolled students. On the other hand, their presence in technical-industrial families is almost anecdotal, both in the traditional ones (such as Electricity and Electronics or Installation and Maintenance, where they account for barely 3% of the enrolled students) and in the more innovative Computer and Communications (8%). These are the data for intermediate level vocational training. In higher level vocational training studies, the greater presence of women in these studies hardly modifies this pattern, but softens the concentration of women in certain professional families, adding Commerce and Marketing, and Hotel and Catering, to those already mentioned. Segregation by professional families is also maintained in this training cycle, in accordance with the aforementioned pattern, which is very similar to that of the EU as a whole. See: EIGS. *Study and Work in the EU: Set Apart by Gender*. Vilnius: European Institute for Gender Equality, 2018. <https://eige.europa.eu/publications/study-and-work-eu-set-apart-gender-report>.

⁶¹ Particularly significant is the fact that there are autonomous communities with rates well above the national average in terms of educational drop-out rates which, nevertheless, have a low unemployment rate, which is evidence of the lack of demand on the part of the business community for adequate and sufficient training. This situation means that training is not perceived by young people as a necessary requirement to access a job, strengthening the erroneous belief that "studying is useless"

⁶² Dual vocational training is a type of vocational training in which both the educational centre and the company are jointly responsible for the student's training. Thus, the student combines the theoretical

training received in an educational centre with the practical activity in a workplace. For further details, see: Department of Education and Vocational Training. "Formación Profesional Dual." Department of Education and Vocational Training <https://www.todofp.es/sobre-fp/informacion-general/formacion-profesional-dual/preguntas-frecuentes.html>.

⁶³ There are many reasons for this low implementation, but two stand out: 1) the predominance of SMEs in our production system, which find it more difficult to participate in this type of programmes, and 2) the conditions offered to Spanish students, which are less advantageous than those of their European counterparts (e.g. in Germany, most students receive a stipend during the course and have a high probability of being hired by the company). For further details, see: Department of Education and Vocational Training. *Plan de Modernización de la Formación Profesional*. Madrid, 2020. https://www.lamoncloa.gob.es/serviciosdeprensa/notasprensa/educacion/Documents/2020/220720-Plan_modernizacion_FP.pdf. Data correspond to 2018 or latest available year. Data for the OECD and EU-8 have been calculated as a simple average of the available countries in these groups. For further details, see: OECD. *Enrolment of students in upper secondary education by category of education (School and work-based vocational programmes)*. <https://stats.oecd.org/>. <https://stats.oecd.org/>.

⁶⁴ For example, after interviewing 53 companies representative of the Spanish economy, Canals *et al* find that 68% of them have a significant knowledge gap in technology and digitalisation among university graduates (48% in the case of vocational training graduates). See: Blázquez, María Luisa, Roger Mesclans, and Jordi Canals. "El futuro del empleo y las competencias profesionales del futuro: la perspectiva de las empresas." *The Education for Jobs Initiative, IESE Business School* <https://media.iese.edu/research/pdfs/ST-0490.pdf>; Llorens García, Ariadna, Joana d'Arc Prat Farran, and Jasmina Berbegal-Mirabent. "ICT skills gap in Spain: Before and after a decade of harmonizing the European Higher Education Area." *Computer Applications in Engineering Education* 27, n.º 4, 2019. <https://doi.org/10.1002/cae.22132> and Vaasa University of Applied Sciences, Inova Consultancy, Militos Consulting, and Conexx-Europe. *Employment Challenges and Training Needs of Unemployed and Underemployed Higher Education Graduates in Europe*. Rebooting, Re-Rooting and Re-Skilling Unemployed and Underemployed Higher Education Graduates for Work 4.0., 2019. http://reboot-project.eu/wp-content/uploads/2019/06/report_final.pdf.

⁶⁵ The majority of graduates go on to university degrees with fewer job opportunities. See: Pérez García, Francisco, and Joaquín Aldás-Manzano (dirs.). "U-Ranking 2020: 8a edición. Indicadores Sintéticos de las Universidades Españolas." *Fundación BBVA, Ivie*, 2020. http://doi.org/10.12842/RANKINGS_SP_ISSUE_2020.

⁶⁶ Economic and Social Council. *Competencias profesionales y empleabilidad*. Madrid: Departamento De Publicaciones Nices, n.º 03/2015, 2015. https://www.forem.es/assets/files/INFORME_COMPETENCIAS_CES.PDF.

⁶⁷ Fundación Conocimiento y Desarrollo. *Resumen ejecutivo: La pandemia y los nuevos y viejos desafíos a los que ha de hacer frente la universidad*. 2020. <https://www.fundacioncyd.org/wp-content/uploads/2020/12/ICYD2019-B-RESUMEN.pdf>.

⁶⁸ For example, it entails additional costs for companies. Staff who feel

overqualified for their job are often not motivated to stay on as a result of their legitimate aspiration to occupy a position that corresponds to their training. This results in a higher turnover rate of these staff, with the consequent direct or indirect costs of on-site training and time to reach optimal performance in said position.

⁶⁹ Fundación Conocimiento y Desarrollo. Resumen ejecutivo: *La pandemia y los nuevos y viejos desafíos a los que ha de hacer frente la universidad*. 2020. <https://www.fundacioncyd.org/wp-content/uploads/2020/12/ICYD2019-B-RESUMEN.pdf>.

⁷⁰ OECD. *Benchmarking higher education system performance: conceptual framework and data*. Paris: OCDE Publishing, Enhancing Higher Education System Performance, 2017. <https://www.oecd.org/education/skills-beyond-school/Benchmarking%20Report.pdf>.

⁷¹ OECD. *Skills Matter: Further Results from the Survey of Adult Skills*. Paris: OECD Publishing, 2016. <https://doi.org/10.1787/9789264258051-en>.

⁷² De las Alas-Pumariño, Tona Rubio (coord.). "Situación y retos de las universidades españolas ante la transformación digital." *Conferencia de consejos sociales de las universidades españolas, colecciones e informes*. 2020. <https://euskampus.eu/eu/media/docs/estudios-e-infomes-no-8-digital-portada.pdf>.

⁷³ To date, we lack precise indicators to measure this phenomenon and provide an international comparison. The U-Multirank quantifies "income from continuing education" over "total income of the institution", and the *Informe 2018* of the Fundación CyD uses the figure as an indicator of how much training Spanish universities offer to workers and companies. However, given the significant differences in funding systems among European universities, this does not seem to us to be a good indicator. For further details, see: Fundación Conocimiento y Desarrollo. *Informe CYD 2018*. Barcelona, 2018. <https://www.fundacioncyd.org/publicaciones-cyd/informe-cyd-2018/>; y U-Multirank, <https://www.umultirank.org/>.

⁷⁴ From 80,807 enterprises in 1996 to 339,846 in 2019. Data up to 2003 are obtained from FUNDAE's historical training database, while from 2004 onwards the most recent FUNDAE statistical series are used. For further details, see: FUNDAE. *Series estadísticas de participantes en formación y empresas formadoras*. <https://www.fundae.es/publicaciones/series-estadisticas>; and FUNDAE. *Formación histórica (I-III ANFC y Acciones Complementarias)*. <https://www.fundae.es/publicaciones/sintesis-estadisticas?filterType=7,8,9,10>.

⁷⁵ Lope, Andreu. "Ampliar y Mejorar La Formación de Las Personas Ocupadas: Una Necesidad." *Informes Del Observatorio Social "La Caixa"*, 2019. https://observatoriosocialcaixa.org/en/seccion/-/asset_publisher/CjICdPpSYHNX/content/formacion-personas-ocupadas.

⁷⁶ FUNDAE. *Formación en las empresas. Informe anual 2016*. Madrid, 2017. <https://www.fundae.es/docs/default-source/publicaciones-y-evaluaciones/publicaciones-estad%C3%ADstica/formaci%C3%B3n-en-las-empresas-2016.pdf>.

⁷⁷ FUNDAE. *Series estadísticas según año de realización de la formación*. <https://www.fundae.es/publicaciones/series-estadisticas>; and Department of Industry, Commerce and Tourism. *Cifras PYME (cifras de empresas por tamaño para enero 2013 y 2019)*. <http://www.ipyme.org/es-ES/publicaciones/Paginas/estadisticaspyme.aspx>.

⁷⁸ In terms of participants (the same employee can take more than one training course), the number of participants increased from 596,506 in 2004 to 4,619,901 in 2019. For further details, see: FUNDAE. *Formación para el empleo: Balance de la situación 2009*. Madrid, 2009. <https://www.fundae.es/docs/default-source/publicaciones-y-evaluaciones/publicaciones-estad%C3%ADstica/balance-de-resultados-2009.pdf>; FUNDAE. *Formación para el empleo: Balance de la situación 2019*. Madrid, 2019. <https://www.fundae.es/docs/default-source/publicaciones-y-evaluaciones/publicaciones-estad%C3%ADstica/balance-de-situación-2019.pdf>; and INE. *EPA, número total de ocupados*. <https://www.ine.es/dynt3/inebase/index.htm?padre=979&capsel=982>.

⁷⁹ Eurostat. *Participation rate in education and training by labour status [trng_aes_103]*. <https://ec.europa.eu/eurostat/data/database>.

⁸⁰ Although the presence of women in training programmes has grown (from 40% in 2005 to 44% in 2016 and the same percentage in 2019), a gender gap remains. The over-55s and young people up to the age of 25 receive less training than would be appropriate for their presence in companies. Moreover, there is a progressive concentration of re-qualification in a few professional families: out of the 27 existing ones, 7 of them account for more than 85% of the training. Executives, technicians, middle management and, in general, those with a university education participate more than those with only primary or secondary education. In other words, more training is given to those already trained. Likewise, higher rates of re-skilling are found in jobs with a lower risk of automation, and lower rates in jobs more exposed to the possibility of automation. For further details, see: FUNDAE. *Número de participantes formados por edad, género y familias profesionales*. <https://www.fundae.es/publicaciones/series-estadisticas>.

⁸¹ FUNDAE. *Series estadísticas según año de realización de la formación*. <https://www.fundae.es/publicaciones/series-estadisticas>.

⁸² Data are from the CEDEFOP's *European Skills and Job Survey* and show the recoded response to question "Q27_1_ scale" in three categories: 0-3 = has worsened. 4-6 = has remained the same. 7/10 = has improved. The original question is as follows: "Compared to when you started your job with your current employer, would you say that your skills have now improved, worsened or stayed the same?", where 0 is "worsened a lot", 5 is "stayed the same", and 10 is "improven a lot". The EU-8 is constructed as the simple average of the values of the individual countries. See: CEDEFOP. *European Skills and Jobs Survey (ESJS)*. <https://www.cedefop.europa.eu/en/events-and-projects/projects/european-skills-and-jobs-survey-esjs>.

⁸³ The unemployed are excluded from the total number of participants. In 2008, they accounted for 6.4% of the total. For further details, see: Fundación Tripartita para la Formación en el Empleo. *Informe resultados Formación de Oferta 2007 - 2011*. Madrid, 2020. <https://www.fundae.es/docs/default-source/publicaciones-y-evaluaciones/publicaciones-estad%C3%ADstica/informe-resultados-formaci%C3%B3n-de-oferta-2007-2011.pdf>.

⁸⁴ The unemployed are excluded from the total number of participants. In 2019, they accounted for 26% of the total. For further details, see: FUNDAE. *Formación de oferta estatal dirigida principalmente a ocupados. Año de ejecución 2019*. Madrid, 2020. <https://www.fundae.es/docs/default-source/publicaciones-y-evaluaciones/publicaciones-estad%C3%ADstica/formación-de-oferta-estatal-2019.pdf>.

⁸⁵ Employed persons over the age of 45 are trained at a lower rate than that resulting from their participation in employment. Almost 50% of those trained in 2015 were university graduates and one third were managers, middle managers or technicians. Less intensively than in the case of *in-company* training, the more highly educated also receive more training *on offer*. See: Lope, Andreu. "Limitaciones de la formación a personas ocupadas para adecuar sus capacidades a los cambios en el empleo." In Fausto Miguélez (coord.) *La revolución digital en España. Impacto y retos sobre el mercado de trabajo y el bienestar*. Bellaterra: UAB, 2018. <https://ddd.uab.cat/record/190326>.

⁸⁶ The latter is being reversed with e-learning, which covered 86% of courses in 2019. See: FUNDAE. *Formación de oferta estatal dirigida principalmente a ocupados. Año de ejecución 2019*. Madrid, 2020. <https://www.fundae.es/docs/default-source/publicaciones-y-evaluaciones/publicaciones-estad%C3%ADstica/formaci3n-de-oferta-estatal-2019.pdf>.

⁸⁷ From the 857 million euros that the State and the Autonomous Communities earmarked for training *on offer* in 2010, the figure fell to 350 million in 2019, with some years, such as 2017, in which there was no allocation. This irregularity prevents the implementation of competitive programmes and coherent strategies sustained over time.

⁸⁸ For more information, see: Card, David, Jochen Kluge, and Andrea Weber. "Active Labor Market Policy Evaluations: A Meta-Analysis." *The Economic Journal* 120, n.º 548, 2010. <https://doi.org/10.1111/j.1468-0297.2010.02387.x>; Card, David, Jochen Kluge, and Andrea Weber. "What Works? A Meta Analysis of Recent Active Labor Market Program Evaluations." *Journal of the European Economic Association* 16, n.º 3, 2018. <https://doi.org/10.1093/jeea/jvx028>; Ghirelli, Corinna, et al. "Does On-the-Job Training Help Graduates Find a Job? Evidence from an Italian Region." *International Journal of Manpower* 40, n.º 3, 2019. <https://doi.org/10.1108/IJM-02-2018-0062>; Grunau, Philipp, and Julia Lang. "Requalification for the unemployed and the quality of the job match." *Applied Economics* 52, n.º 47, 2020. <https://doi.org/10.1080/00036846.2020.1753879>; Kruppe, Thomas, and Julia Lang. "Labour Market Effects of Requalification for the Unemployed. The Role of Occupations." *Applied Economics* 50, n.º 14, 2018. <https://doi.org/10.1080/00036846.2017.1368992>; Lechner, Michael, and Blaise Melly. "Partial Identification of Wage Effects of Training Programs." *Brown University Economics Working Paper*, n.º 2010-8, 2010. <http://dx.doi.org/10.2139/ssrn.1596715>; Munch, Jakob Roland, and Lars Skipper. "Program Participation, Labor Force Dynamics, and Accepted Wage Rates." In Fomby, Tom, et al. (eds.). *Modelling and Evaluating Treatment Effects in Econometrics, Volume 2 (Advances in Econometrics)*. London: Emerald Group Publishing, 2008. [https://doi.org/10.1016/S0731-9053\(07\)00008-4](https://doi.org/10.1016/S0731-9053(07)00008-4).

⁸⁹ Eurostat. *Mean instruction hours spent by participant in education and training by labour status [trng_aes_149]*. <https://ec.europa.eu/eurostat/data/database>.

⁹⁰ The figure is constructed using data from two different sources: until 2000, the data provided by the INEM are used and, from then onwards, the SEPE years are used. In addition, the series is represented as a percentage of the total unemployed. For further details, see: INEM. *Información sobre mercado de trabajo. Resumen anual de datos del Observatorio Ocupacional 1995*. Madrid, 1996; INEM. *Información sobre mercado de trabajo. Resumen anual de datos del Observatorio*

Ocupacional 1998. Madrid, 1999; INEM. *Información sobre mercado de trabajo. Resumen anual de datos del Observatorio Ocupacional 2000*. Madrid, 2002; OCDE. *ALFS Summary tables. Unemployment by thousands of persons*. <https://stats.oecd.org/>; and Servicio Público de Empleo Estatal. *Número de trabajadores desempleados que han recibido formación*. Data provided by SEPE (State Public Employment Service) on request.

⁹¹ The EU-8 is constructed as the simple average of the values of the individual countries, and the EU-27 is the aggregate indicator reported by Eurostat. In the case of formal education and training, data for Sweden, the Netherlands, Austria and Germany are not included due to lack of data. For further details, see: Eurostat. *Participation rate in education and training by labour status [trng_aes_103]*. <https://ec.europa.eu/eurostat/data/database>.

⁹² Data for the year 2018. The EU-8 average is constructed as the simple average of the values of the individual countries. For further details, see: Eurostat. *Unemployment by sex, age and citizenship (1 000) [lfsa_ugan]; y LMP expenditure by type of action - summary tables in Million euro (at constant 2010 prices) (LMP_EXPSUMM)*. <https://ec.europa.eu/eurostat/data/database>.

⁹³ In Spain, between 2015 and 2018, public spending on active employment policies was 0.64% of GDP. Of this percentage, around 17% was spent on training (both employed and unemployed), which accounts for 0.11% of GDP. The EU-8 and EU-27 averages are constructed as the simple average of the values of the individual countries available for each period. The EU-22 consists of the EU-27 member countries that are also members of the OECD. For further details, see: De la Rica, Sara. "Políticas activas de empleo: Una panorámica." *FEDEA, Policy Papers*, n.º 2015/01, 2015. <http://documentos.fedea.net/pubs/fpp/2015/01/FPP2015-01.pdf>; and OECD. *Public expenditure and participant stocks on LMP - Training as a percentage of GDP*. <https://stats.oecd.org/>.

⁹⁴ Official State Gazette. *Ley 30/2015, de 9 de septiembre, por la que se regula el Sistema de Formación Profesional para el empleo en el ámbito laboral*. Madrid, 2015. <https://www.boe.es/eli/es/l/2015/09/09/30/con>.

⁹⁵ Servicio de Empleo Público (State Public Employment Service). "Prospección y Detección de Necesidades Formativas." Servicio Público de Empleo Estatal, <https://www.sepe.es/HomeSepe/que-es-el-sepe/observatorio/necesidades-formativas/ver-resultados.html?documentType=prospecciones&>.

⁹⁶ It has risen from 8.6 in 1990 to 12.1 in 2019. Data correspond to the EU-27, which is constructed as the simple average of the values of the individual countries. Specifically, the variable is the average number of years of education received by persons aged 25 and over. For further details, see: United Nations Development Programme. *Human Development Reports. Mean years of schooling (years)*. <http://hdr.undp.org/en/indicators/103006#>.

⁹⁷ Specifically, it has risen from 11.7% to 29.5%. For the year 1990, data from Barro and Lee are used, and the EU-27 is constructed as the simple average of the values of the individual countries. This percentage is the total population aged 25 and over with tertiary education. The data for 2019 is from Eurostat and includes the population aged 25-74. In this case, the EU-27 is the aggregate indicator reported by Eurostat. For further details, see: Barro, Robert, and Jong-Wha Lee. "A New Data Set of Educational Attainment in the World, 1950-2010." *Journal of*

Development Economics 104, 2013. <https://www.nber.org/papers/w15902>; and Eurostat. *Population by educational attainment level, sex and age (%) [edat_lfs_9903]*. <https://ec.europa.eu/eurostat/data/database>.

⁹⁸In 2018, OECD data by level of education are represented, while for 2050, *International Institute for Applied Systems Analysis* and Lutz *et al.* data are used. For the 2050 data, only data for the 25-64 age group are selected in the *Global Education Trend (Medium assumption)* scenario defined in the Lutz *et al.* report. The EU-8 and EU-22 are constructed as the simple average of the values of the individual countries. The EU-22 consists of the EU-27 member countries that are also members of the OECD, which excludes Bulgaria, Croatia, Cyprus, Malta and Romania. Three levels of education are represented in the graph: i) higher education which includes short post-secondary education (vocational or post-secondary non-tertiary certificates and short-cycle higher or tertiary vocational training), bachelor degree or equivalent, master's degree or equivalent and doctorate; ii) upper secondary education which includes high school, intermediate level vocational training, access course to intermediate level vocational training, basic vocational training and other equivalents; and iii) lower than second stage of secondary education which contains less than primary education, primary education and first stage of secondary education. For further details, see: INE. "Clasificación Nacional de Educación 2014. CNED-2014. Clasificación de programas, titulaciones y certificaciones en niveles de formación alcanzados (CNED-A): Estructura." INE, https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736177034&menu=ultiDatos&idp=1254735976614; International Institute for Applied Systems Analysis. *Global population and human capital projections for Shared Socioeconomic Pathways – 2015 to 2100, Revision-2018*. <https://dare.iiasa.ac.at/105/>; Lutz, Wolfgang, *et al.* (eds.). *Demographic and human capital scenarios for the 21st century 2018 assessment for 201 countries*. Luxembourg: Publications Office of the European Union, 2018. https://ec.europa.eu/jrc/sites/jrcsh/files/lutz_et_al_2018_demographic_and_human_capital.pdf; and OECD. *Educational attainment and labour-force status y Population data*. <https://stats.oecd.org/>.

⁹⁹Even if the drop-out rate is reduced to 3% in 2050, the high proportion of 25-64 year olds with upper secondary education (39% of the total compared to 16% in the EU-8) limits the possibility of reaching the same structure as the EU-8 in 2050.

¹⁰⁰A recent report concludes that the undergraduate and master's student population will increase by 300,000-600,000 between now and 2035. The reason for this increase is the combination of higher university enrolment rates and an increase in the population of the age cohorts in these educational stages (the result of the incorporation of the cohorts born between 1997 and 2008, which are larger due to immigration). In our analysis, we also project a growth in the number of university students up to 2030, albeit more modest since we do not incorporate potential students aged 25 and over and take into account the effects of both the upgrading of intermediate level vocational education and a more dynamic labour market. It is from 2030 onwards that demographic dynamics take hold and impact on the size of the university population. For further details, see: Puyol, Rafael. "Universitarios en España: Estudio sociodemográfico de su demanda futura (2030-2035)." *UNIR, Nueva Revista de Política, Cultura y Arte*, 2021. <https://www.unir.net/wp-content/uploads/2021/02/UNIVERSARIOS-EN-ESPANA%CC%83A.pdf>.

¹⁰¹For further details on the elaboration of the graph, see the *Methodology note* number VI. For further details, see: Eurostat. *Population on 1 January by age and sex [demo_pjan]*; *Population on 1st January by age, sex and type of projection [proj_19np]*. *Employment by sex, age and citizenship (1 000) [lfsa_egan]*; *Active population by sex, age and citizenship (1 000) [lfsa_agan]*; *Unemployment rates by sex, age and citizenship (%) [lfsa_urgan]*; *Young people neither in employment nor in education and training by sex, age and labour status (NEET rates) [edat_lfse_20]*. <https://ec.europa.eu/eurostat/data/database>; and Department of Education and Vocational Training. *Escolarización y entorno educativo. Escolarización y población de 0 a 29 años*. <https://www.educacionyfp.gob.es/inee/indicadores/sistema-estatal/mapa-indicadores.html>; and Department of Education and Vocational Training. *Las cifras de la educación en España. Curso 2018-19. D5. La formación profesional, y D7. La educación universitaria*. <https://www.educacionyfp.gob.es/servicios-al-ciudadano/estadisticas/indicadores/cifras-educacion-espana/2018-2019.html>; and Department of Universities. *Datos y cifras del Sistema Universitario Español. Publicación 2019-2020*. Madrid, 2020. https://www.ciencia.gob.es/stfls/MICINN/Universidades/Ficheros/Estadisticas/Informe_Datos_Cifras_Sistema_Universitario_Espanol_2019-2020.pdf.

¹⁰²The number of public universities has increased from 36 in 1990 to 50 in the 2019-2020 academic year. The 1990 figure is from García López and Simancas González while the 2019 figure is from the Department of Education and Vocational Training. For further details, see: García López, Marcial and Esther Simancas González. "Historia de un secuestro: de la Iglesia a la Marca. Evolución histórica de la universidad en España." *Chasqui*, n.º 133, 2016. <https://revistachasqui.org/index.php/chasqui/article/view/2953>; and Department of Education and Vocational Training. *Estructura Universitaria. Número de universidades con actividad por tipo y modalidad de la universidad*. <http://estadisticas.mecd.gob.es/EducaDynPx/educabase/index.htm?type=pcaxis&path=/Universitaria/EUCT/Serie//Estructura/&file=pcaxis>.

¹⁰³In the academic year 1985-1986 there were 28,817 students enrolled in private universities while in the academic year 2019-2020 provisional data suggest that this number was 318,783 students. Such high increases have not been seen in public universities, where the number of students enrolled has gone from 797,596 to 1,314,575 in the same period. For further details, see: Department of Education and Vocational Training. *Series históricas de estudiantes universitarios desde el curso 1985-1986. Total SUE. Matriculados por tipo y modalidad de la universidad, nivel de estudio, sexo y rama de enseñanza*. http://estadisticas.mecd.gob.es/EducaDynPx/educabase/index.htm?type=pcaxis&path=/Universitaria/Alumnado/Nueva_Estructura/Serie/TotalSUE/&file=pcaxis.

¹⁰⁴Fundación Conocimiento y Desarrollo. *Informe CYD 2019*. 2019. <https://www.fundacioncyd.org/publicaciones-cyd/informe-cyd-2019/>.

¹⁰⁵See: CEDEFOP, and Eurofound. *Skills forecast: trends and challenges to 2030*. Luxembourg: Publications Office of the European Union, CEDEFOP reference series, n.º 108, 2018. https://economix.org/a55ets/publications/CEDEFOP_Skills_Forecast_2030_-_Forecast_2018_1.pdf; and OECD. *Skills for 2030: Conceptual Learning Framework*. Paris: OECD Publishing, 2019. https://www.oecd.org/education/2030-project/teaching-and-learning/learning/skills/Skills_for_2030_concept_note.pdf.

¹⁰⁶ See, for example: CEDEFOP. *Skills forecast for Spain 2018*. Luxembourg: Publications Office of the European Union, 2018. https://www.cedefop.europa.eu/files/cedefop_skills_forecast_2018_-_spanin.pdf; Smit, Sven, Tilman Tacke, Susan Lund, James Manyika, and Lea Thiel. *The future of work in Europe: Automation, workforce transitions, and the shifting geography of employment*. McKinsey Global Institute, 2020. <https://www.mckinsey.com/~media/McKinsey/Industries/Public%20and%20Social%20Sector>; and World Economic Forum. *Future of Jobs Report 2018*. Geneva, 2018. http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf.

¹⁰⁷ Stiglitz, Joseph E., and Bruce C. Greenwald. *Creating a Learning Society: A New Approach to Growth, Development and Social Progress*. New York: Columbia University Press, 2014.

¹⁰⁸ See: Van Breugel, Gerla. "Identification and anticipation of skill requirements: Instruments used by international institutions and developed countries." *Economic Commission for Latin America (ECLA), Document projects*. Santiago: United Nations, 2017. https://www.oitcenterfor.org/sites/default/files/file_publicacion/Identifi_ant_skillsrequirements.pdf; Wilson, Rob. "Skills Forecasts in a Rapidly Changing World: Through a Glass Darkly." En McGrath, Simon, *et al.* (eds.) *Handbook of Vocational Education and Training Developments in the Changing World of Work*. New York: Springer, 2018. https://doi.org/10.1007/978-3-319-49789-1_74-1; and Kriechel, Ben, Tomáš Rašovec, and Rob Wilson. "Skills Forecast." In ETF, ILO and CEDEFOP *Developing Skills Foresight, Scenarios and Forecasts: Guide To Anticipating And Matching Skills And Jobs Volume 2*. Part B. Luxembourg: Publications Office of the European Union, 2016. <https://doi.org/10.2816/376143>.

¹⁰⁹ Martínez García, José S., and Pablo Molina Derteano. "Fracaso escolar, crisis económica y desigualdad de oportunidades educativas: España y Argentina." *Papers UAB*, 2019. <https://papers.uab.cat/article/view/v104-n2-martinez-molina>; and Serrano, Lorenzo, *et al.* "El abandono educativo temprano: análisis del caso español." *Instituto Valenciano de Investigaciones Económicas*, 2013. http://web2016.ivie.es/wp-content/uploads/2017/06/Informe_Abandono_Educativo_Temprano.pdf.

¹¹⁰ Even if the educational composition of the population beyond lower secondary education remains stable at current proportions, the demographic effect would reduce the number of potential tertiary education graduates by 2050. For further details, see: Eurostat. *Population on 1 January by age and sex [demo_pjan]; Population on 1st January by age, sex and type of projection [proj_19np]*. <https://ec.europa.eu/eurostat/data/database>.

¹¹¹ Denmark is taken as a reference for two main reasons: it is a world educational power and has a similar level of per capita income today as Spain will have in 2050 if it implements the changes set out in this *Strategy*.

¹¹² Public expenditure as a share of GDP would increase by only 4 tenths of a percentage point. For further details, see the *Methodologic note* número VI. For more data and ideas:

¹¹³ Pardos, Zachary A., Zihao Fan, and Weijie Jiang. "Connectionist Recommendation in the Wild: On the utility and scrutability of neural networks for personalized course guidance." *User modeling and user-adapted interaction*, 2018. <https://arxiv.org/abs/1803.09535>.

¹¹⁴ Australian Government. "Skills Match." Australian Government,

<https://joboutlook.gov.au/career-tools/skills-match/>.

¹¹⁵ In 2016, only 30% of those who undertook formal training and 17% who undertook non-formal training did so on a distance basis. For further details, see: INE. *Encuesta sobre la participación de la población adulta en las actividades de aprendizaje en 2016*. https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=estadistica_C&cid=1254736176759&menu=resultados&idp=1254735573113#!tabs-1254736194656.

¹¹⁶ The OECD is the aggregate indicator reported by the OECD. For further details, see: OECD. *Dashboard on priorities for adult learning*. <http://www.oecd.org/els/emp/skills-and-work/adult-learning/dashboard.htm>. The "development subindex" of the *Global Human Capital Report* produced by the World Economic Forum offers a similar diagnosis. See: World Economic Forum. *The Global Human Capital Report 2017: Preparing People for the Future of Work*. Geneva, 2017. http://www3.weforum.org/docs/WEF_Global_Human_Capital_Report_2017.pdf.

¹¹⁷ OECD. "Skill measures to mobilise the workforce during the COVID-19 crisis." OECD, <https://www.oecd.org/coronavirus/policy-responses/skill-measures-to-mobilise-the-workforce-during-the-covid-19-crisis-afd33a65/>.

¹¹⁸ The literature is inconclusive on whether investment in human capital and re-skilling is counter-cyclical, pro-cyclical or even a-cyclical. Logically, one would expect that, during a period of economic difficulty such as the one that will occur in our country over the next few years, participation rates in re-qualification programmes will increase. After all, for workers who lose their jobs, acquiring new knowledge and skills can be a key route to re-employment. This was not what happened during the Great Recession of 2008. In that period, the participation of employed persons in requalification programmes hardly increased, and the participation of unemployed persons even decreased, despite the increase in unemployment and the collapse of traditional sectors such as construction. This trend was the result of several factors: the substantial cuts in funding for *in-company* training and training offered by the State; the precariousness in which many of those who became unemployed during the recession found themselves, which made it difficult to devote resources to anything other than basic survival; the very profile of these people, who were less likely to participate in re-training programmes; and the inadequacy of much of the training on offer. On this question, see, for example: Calero, Jorge. "El acceso a la formación permanente: efectos de la crisis económica." *Revista de Ciencias y Humanidades de la Fundación Ramón Areces* 7, 2012. <https://www.fundacionareces.es/fundacionareces/es/publicaciones/listado-de-publicaciones/revista-fra-n-7.html?tipo=6>; y Felgueroso, Florentino. "Claves para mejorar la educación y formación de adultos en España en la post-crisis." *FEDEA, Reflexiones sobre el sistema educativo español*, 2015. <http://www.sociedadeducacion.org/site/wp-content/uploads/Claves-para-la-mejora-educacion-de-adultos.pdf>.

¹¹⁹ Ernst & Young. *Las empresas españolas frente a la revolución del reskilling*. 2020. https://www.ey.com/es_es/workforce/las-empresas-espanolas-frente-a-la-revolucion-del-reskilling.

¹²⁰ This plan dedicates in its components 19 "National Plan for Digital Skills" and 20 "Strategic Plan for the Promotion of Vocational Training" more than 2,400 million euros to training for employment, through the reinforcement of active policies, training in digital skills, the evaluation and accreditation of professional skills, and greater access to professional training through the creation of "Aulas Mentor",

among other things. In addition, component 23 "New public policies for a dynamic, resilient and inclusive labour market" dedicates additional funds for the training of the active population in order to improve their employability, and for the detection of training needs and their adaptation to the demands of the productive system. See: Government of Spain. *Recovery, Transformation and Resilience Plan*. Madrid, 2021. <https://www.lamoncloa.gob.es/presidente/actividades/Documents/2021/130421-%20Plan%20de%20recuperacion%2C%20Transformacion%20y%20Resiliencia.pdf>.

¹²¹ The EU-8 is constructed as the simple average of the values of the individual countries, and the EU-27 is the aggregate indicator reported by Eurostat. It should be noted that the objective of the *European Skills Agenda* excludes work-guided training, hence the differences between the 43% (including work-guided training) attributed to Spain by Eurostat and the 30% (excluding work-guided training) used here. For further details, see: CIRCABC. *Participation in Education and Training (excluding guided on the job training)*. <https://circabc.europa.eu/ui/group/d14c857a-601d-438a-b878-4b4cebd0e10f/library/c5a8b987-1e37-44d7-a20e-2c50d6101d27/details>; and European Commission. "European Skills Agenda." European Commission, <https://ec.europa.eu/social/main.jsp?catId=1223&langId=en>.

¹²² When we disaggregate this information by gender, the percentage of women who participated in some formal activity was 9% compared to 8% for men. When we disaggregate this information by gender, the percentage of women who participated in some formal activity was 9% compared to 8% for men

¹²³ If we disaggregate this information by gender, the percentage of women who participated in some non-formal activity was 35.9% and 37.6% for men

¹²⁴ For each type of activity, the following are included: (i) adult education: initial basic education for adults; adult secondary education and similar; (ii) secondary education or High school: compulsory secondary education (years 1, 2 and 3); compulsory secondary education (year 4); high school and similar; (iii) vocational training: intermediate and equivalent vocational training, plastic arts and design and sports education; higher and equivalent vocational training, plastic arts and design and sports education; (iv) Undergraduate degree, diploma or equivalent: university degrees of 240 ECTS credits and equivalent; university diplomas and equivalent; university degrees of more than 240 ECTS credits and equivalent; bachelor's degrees and equivalent; (v) Postgraduate degree (master's or Ph): official university master's degrees and equivalent; specialisations in Health Sciences by the residency system and similar; own university master's degrees of 60 ECTS or more for university graduates; PhD; (vi) Official language schools: teaching in official language schools; (vii) others: elementary music and dance teaching; level 1 professional certificates and similar; professional music and dance teaching and similar; initial professional qualification programmes and similar; level 2 professional certificates and similar; basic vocational training; level 3 professional certificates; short programmes requiring a second stage of secondary education and similar; own university degrees requiring a high school degree, lasting two years or more; own university expert or specialist degrees of less than 60 ECTS credits for university graduates

¹²⁵ For further details, see: INE. *Encuesta sobre la participación de la población adulta en las actividades de aprendizaje en 2016*. https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=estadistica_C&cid=1254736176759&menu=resultados&idp=1254735573113#!tabs-1254736194656.

¹²⁶ When comparing the INE survey on the participation of the adult population in learning activities in 2016 with the official data reported by the State in the same year, there is a wide difference. Thus, while in the INE survey the number of adults claiming to have participated in some formal or non-formal training activity was around 8,000,000, the official data reported was around 4,800,000. For further details, see: Eurostat. *Participation rate in education and training by sex [trng_aes_100]*. <https://ec.europa.eu/eurostat/data/database>; FUNDAE. *Número de participantes formados y horas de formación por edad*. <https://www.fundae.es/publicaciones/series-estadisticas>; INE. *Población residente por fecha, sexo y edad (25-64 años)*. <https://www.ine.es/dynt3/inebase/es/index.htm?padre=1894&capsel=1895>; INE. *Encuesta sobre la participación de la población adulta en las actividades de aprendizaje en 2016*. https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=estadistica_C&cid=1254736176759&menu=resultados&idp=1254735573113#!tabs-1254736194656; Department of Universities. *Catálogo de datos. Estadística de estudiantes. Matriculados por tipo (Grado, Máster, Doctorado)*. <https://www.universidades.gob.es/portal/site/universidades/menuitem.78fe777017742d34e0acc310026041a0/?vgnnextoid=3b80122d36680710VgnVCM1000001d04140aRCRD>; and Department of Education and Vocational Training. *Enseñanzas no universitarias / alumnado matriculado / series / enseñanzas de régimen general (Alumnado matriculado en Grado Medio y Grado Superior)*. <http://estadisticas.mecd.gob.es/EducaDynPx/educabase/index.htm?type=pcaxis&path=/Educacion/Alumnado/Matriculado/Series20/SeriesAlumnado&file=pcaxis&l=s0>; and Department of Education and Vocational Training. *Alumnado matriculado en Enseñanzas de idiomas de 25 años o más*. <http://estadisticas.mecd.gob.es/EducaDynPx/educabase/index.htm?type=pcaxis&path=/Educacion/Alumnado/Matriculado/2016-2017RD/REIdiomas&file=pcaxis&l=s0>; and Servicio Público de Empleo Estatal (State Public Employment Service). *Número de trabajadores desempleados que han recibido formación*. Data provided by SEPE (State Public Employment Service) on request.

¹²⁷ To estimate the number of working-age people whose skills will become outdated over the next few years, we carried out a simple exercise that takes as a starting point the rate of skills obsolescence reported by 4,000 Spanish workers in the ESJS survey conducted by CEDEFOP in 2014. The survey asks about the likelihood of becoming obsolete in the "next five years" The answer is scored from 0 (very unlikely) to 10 (very likely); here we have considered answers between 7 and 10 as high probability. In order to obtain an approximate number of working age people who will need to be re-skilled by 2050, the same answers have been assumed for the whole time axis of the exercise and the results of the employed persons have been extrapolated for the rest of the working age population (considering here the population between 25 and 64 years old), based on Eurostat's demographic projections. Given that the revealed needs for re-skilling of the surveyed population vary according to their educational level, we take into account the change in the educational structure of the population expected by 2050 [see Fig. 23]. In particular, we applied the percentage of people by educational level who revealed in the survey that they had a need for re-qualification high to the projected population

in 2050. Thus, according to the survey, 19% of the population with no more than compulsory secondary education reported a high need for re-qualification, compared to 23% of those with secondary education (2nd stage) and 29% of those with higher education. These estimates are based on the assumption that the rate of skills obsolescence of recent years will continue into the future. This will be true for some sectors and occupations, but not for many others, where digitalisation or the ecological transition will bring about profound changes and make the need for re-skilling even greater. For further details and data, see: CEDEFOP. *European Skills and Jobs Survey (ESJS)*. <https://www.cedefop.europa.eu/en/events-and-projects/projects/european-skills-and-jobs-survey-esjs>; and Eurostat. *Population on 1st January by age, sex and type of projection [proj_19np]*. <https://ec.europa.eu/eurostat/data/database>.

¹²⁸ Department of Education and Vocational Training. *Estudiantes matriculados en Grado y Ciclo Matriculados por nivel académico, tipo y modalidad de la universidad, tipo de centro, sexo, grupo de edad y rama de enseñanza*. http://estadisticas.mecd.gob.es/EducaDynPx/educabase/index.htm?type=pcaxis&path=/Universitaria/Alumnado/Nueva_Estructura/GradoCiclo/Matriculados/&file=pcaxis.

¹²⁹ In line with estimates of tertiary graduates projected to 2030- 2050 and with empirical evidence collected in recent years, which shows that the rate of obsolescence is higher as the level of education increases. See: Murillo, Inés P. "Human Capital Obsolescence: Some Evidence for Spain." *International Journal of Manpower* 32, n.º 4, 2011. <https://doi.org/10.1108/01437721111148540>; and Van Loo, Jasper B. "The Speed of Obsolescence: Evidence from the Dutch Public Sector." *Maastricht University*, 2007. <https://files.eric.ed.gov/fulltext/ED504838.pdf>.

¹³⁰ The *National Plan for Recovery, Transformation and Resilience* project takes important steps in this direction and dedicates in its component 20 "Reskilling and upskilling of the active population linked to professional qualifications" more than 855 million euros to the resizing of the vocational training offer, with 200,000 new vacancies; to the development of innovation and knowledge transfer projects between vocational training centres and companies; to the transformation of medium and higher level training cycles into bilingual cycles; to the conversion of classrooms into spaces for applied technology; and to the creation of entrepreneurship classrooms in public vocational training centres. See: Government of Spain. *Recovery, Transformation and Resilience Plan*. Madrid, 2021. <https://www.lamoncloa.gob.es/presidente/actividades/Documents/2021/130421-%20Plan%20de%20recuperacion%2C%20Transformacion%20y%20Resiliencia.pdf>.

¹³¹ World Economic Forum "At least half of people who have a job fear they'll lose it in the next 12 months." World Economic Forum, <https://www.weforum.org/agenda/2020/10/more-than-half-of-working-adults-fear-for-their-jobs/>.

¹³² The Spanish Circular Economy Strategy emphasises the need to provide training for the jobs called for to boost it. See: Department for Ecological Transition and Demographic Challenge *Estrategia Española de economía circular: España circular 2030*. Madrid, 2020. https://www.miteco.gob.es/es/calidad-y-evaluacion-ambiental/temas/economia-circular/espanacircular2030_def1_tcm30-509532.PDF. Another another example can be found in housing rehabilitation, where qualified personnel in this field will be required. At present, there are specific

vocational training courses in this area, but it is essential to complement them with *in-company* training through dual training processes. For further details, see: Tucat, Pablo. *Reduciendo la pobreza energética en el largo plazo: cómo usar los fondos europeos para la rehabilitación de viviendas*. EsadeEcPol-Center for Economic Policy y Knowledge Sharing Network, 2021. https://itemsweb.esade.edu/research/EsadeEcPol_KSNET_Pobreza.pdf.

¹³³ Eurostat. *Populations Projections [proj_19n]*. <https://ec.europa.eu/eurostat/data/database>.

¹³⁴ The maximum value assumes that all students who manage to avoid dropping out early are successful in obtaining a university degree. The minimum value assumes that these students obtain a post-compulsory secondary or tertiary qualification in the same proportions as observed during the 2005-2012 period (*final educational attainment by 2005-2012 trend*). For further details, see: Serrano, Lorenzo, *et al.* "El abandono educativo temprano: análisis del caso Español." *Instituto Valenciano de Investigaciones Económicas*, 2013. http://web2016.ivie.es/wp-content/uploads/2017/06/Informe_Abandono_Educativo_Temprano.pdf.

¹³⁵ For example, Allen and de Grip find for the Netherlands that re-skilling workers reduces the probability of losing their job by 11%. See: Allen, Jim, and Andries de Grip. "Does skill obsolescence increase the risk of employment loss?" *Applied Economics* 44, n.º 25, 2012. <https://doi.org/10.1080/00036846.2011.570727>.

¹³⁶ On this question, see, for example: Card, David, Jochen Kluge, and Andrea Weber. "What Works? A Meta Analysis of Recent Active Labor Market Program Evaluations." *Journal of the European Economic Association* 16, n.º 3, 2018. <https://doi.org/10.1093/jeea/jvx028>; Dengler, Katharina. "Effectiveness of Active Labour Market Programmes on the Job Quality of Welfare Recipients in Germany." *Journal of Social Policy* 48, n.º 4, 2019. <https://doi.org/10.1017/S0047279419000114>; Grunau, Philipp and Julia Lang. "Requalification for the unemployed and the quality of the job match." *Applied Economics* 52, n.º 47, 2020. <https://doi.org/10.1080/00036846.2020.1753879>; and Kruppe, Thomas, and Julia Lang. "Labour Market Effects of Requalification for the Unemployed. The Role of Occupations." *Applied Economics* 50, n.º 14, 2018. <https://doi.org/10.1080/00036846.2017.1368992>.

¹³⁷ Specifically, the human capital index includes the years of schooling of the adult population and the educational performance according to: Feenstra, Inklaar, and Timmer. *Penn World Table*, version 9.1. *Human capital index, based on years of schooling and returns to education*. www.ggd.net/pwt. Based on: Feenstra, Robert C., Robert Inklaar, and Marcel P. Timmer. "The Next Generation of the Penn World Table." *American Economic Review* 105, n.º 10, 2015. <https://www.aeaweb.org/articles?id=10.1257/aer.20130954>.

¹³⁸ For further details, see the *Methodologic note* number V.

¹³⁹ The population aged 25-34 with a qualification higher than secondary education is defined as the percentage of people in this age range whose highest level of education is the second stage of secondary education (High school or Intermediate Level Vocational Training) or tertiary education (University or Higher Level Vocational Training). The EU-8 is constructed as the simple average of the values of the individual countries, and the EU-27 is the aggregate indicator reported

by Eurostat. The latest data available is from 2019. For further details, see: Eurostat. *Population by educational attainment level, sex and age (%) - main indicators [edat_lfse_03]*. <https://ec.europa.eu/eurostat/data/database>. The population aged 25-34 with a qualification higher than secondary education is defined as the percentage of people in this age range whose highest level of education is the second stage of secondary education (High school or Intermediate Level Vocational Training) or tertiary education (University or Higher Level Vocational Training). The EU-8 is constructed as the simple average of the values of the individual countries, and the EU-27 is the aggregate indicator reported by Eurostat. The latest data available is from 2019. For further details, see: Eurostat. *Population by educational attainment level, sex and age (%) - main indicators [edat_lfse_03]*. <https://ec.europa.eu/eurostat/data/database>.

¹⁴⁰ Public expenditure on education includes both expenditure on pre-primary, primary and secondary education and expenditure on post-compulsory education (high school, vocational training and university). In 2018 (latest year available), post-compulsory education accounted for around 40% of total public expenditure on education in our country. The EU-8 and EU-27 are constructed as the simple average of the values of the individual countries. The latest available data for Spain is from 2018, while for the EU-8 and EU-27 it is from 2017. For further details, see: Department of Education and Vocational Training. *Gasto Público en educación en relación al P.I.B. por cobertura económica, tipo de administración y periodo*. <http://www.educacionyfp.gob.es/servicios-al-ciudadano/estadisticas/economicas/gasto.html>; and UNESCO. *Government expenditure on education as a percentage of GDP (%)*. <http://data.uis.unesco.org/#>

¹⁴¹ Public expenditure on education of 5.5% of GDP is the result of increasing expenditure per student to current Danish levels and assuming a GDP evolution in line with the EU-8 convergence objective [see chapter 1]. The difference compared to the EU-8, which currently spends 6.1% of its GDP on education, is that the reduction in the number of students will be very sharp in the coming decades, allowing us to increase funding per student significantly without such a sharp increase as a percentage of GDP.

¹⁴² The STEM series is constructed from the data on *Natural sciences, mathematics and statistics, Information and Communication Technologies, and Engineering, manufacturing and construction*. The EU-8 is constructed as the simple average of the values of the individual countries, and the EU-27 is the aggregate indicator reported by Eurostat. Data observed are the average from 2015 to 2018. For further details, see: Eurostat. *Students enrolled in tertiary education by education level, programme orientation, sex and field of education [educ_uae_enrt03]*. <https://ec.europa.eu/eurostat/data/database>.

¹⁴³ The EU-8 is constructed as the simple average of the values of the individual countries, and the EU-27 is the aggregate indicator reported by Eurostat. Data are the average from 2015 to 2018. For further details, see: Eurostat. *Individuals who have basic or above basic overall digital skills by sex [TEPSR_SP410]*. https://ec.europa.eu/eurostat/databrowser/view/ISOC_SK_DS_KL_I/default/table?lang=en.

¹⁴⁴ 2025 target of the European Skills Agenda. For further details, see: European Commission. “European Skills Agenda.” European Commission, <https://ec.europa.eu/social/main.jsp?catId=1223&langId=en>.

¹⁴⁵ The EU-8 is constructed as the simple average of the values of the individual countries, and the EU-27 is the aggregate indicator reported by Eurostat. Data observed are from 2016. For further details, see: Eurostat. *Number of foreign languages known (self-reported) by sex [edat_aes_l21]*. <https://ec.europa.eu/eurostat/data/database>.

¹⁴⁶ Guided on-the-job training is excluded. The EU-8 is constructed as the simple average of the values of the individual reported countries, and the EU-27 is the aggregate indicator reported by CIRCABC. Data observed are from 2016. For further details, see: CIRCABC. *Participation in education and training (excluding guided on-the-job training)*. https://circabc.europa.eu/ui/group/d14c857a-601d-438a-b878-4b4cebd0e10f/library/ac6f3889-ab25-4f75-9c7a-de997f65e2db?p=1&n=10&sort=modified_DESC%E2%80%A6.

¹⁴⁷ 2025 target of the European Skills Agenda. For further details, see: European Commission. “European Skills Agenda.” European Commission, <https://ec.europa.eu/social/main.jsp?catId=1223&langId=en>

¹⁴⁸ The EU-8 is constructed as the simple average of the values of the individual countries, and the EU-27 is the aggregate indicator reported by Eurostat. Data observed are from 2016. For further details, see: Eurostat. *Participation rate in education and training by labour status [trng_aes_103]*. <https://ec.europa.eu/eurostat/data/database>.

¹⁴⁹ Spending on active training policies includes the spending aimed at both the employed and unemployed population. The EU-8 and EU-22 are constructed as the simple average of the values of the individual countries when these are available. Data are the average from 2015 to 2018. For further details, see: De la Rica, Sara. “Políticas activas de empleo: Una panorámica.” FEDEA, Policy Papers, n.º 2015/01, 2015. <http://documentos.fedea.net/pubs/fpp/2015/01/FPP2015-01.pdf>; y OCDE. *Public expenditure as a percentage of GDP. 20: Training*. <https://stats.oecd.org/>.

¹⁵⁰ Datos únicamente disponibles para España. For further details, see: FUNDAE. *Formación en las empresas. Informe anual 2016*. Madrid, 2017. <https://www.fundae.es/docs/default-source/publicaciones-y-evaluaciones/publicaciones-estad%C3%ADstica/formaci%C3%B3n-en-las-empresas-2016.pdf>; y FUNDAE. *Formación para el empleo: Balance de la situación 2019*. Madrid, 2019. <https://www.fundae.es/docs/default-source/publicaciones-y-evaluaciones/publicaciones-estad%C3%ADstica/balance-de-situaci%C3%B3n-2019.pdf>

¹⁵¹ See: Bourgeois, Ania, et al. *Adult Education and Training in Europe: Widening Access to Learning Opportunities*. Luxembourg: Publications Office of the European Union, 2015. <https://op.europa.eu/en/publication-detail/-/publication/aaeac7ed-7bad-11e5-9fae-01aa75ed71a1/language-en>; y Felgueroso, Florentino. “Claves para mejorar la educación y formación de adultos en España en la postcrisis.” FEDEA, *Reflexiones sobre el sistema educativo español*, 2015. <http://www.sociedadeducacion.org/site/wp-content/uploads/Clavespara-la-mejora-educacion-de-adultos.pdf>

¹⁵² Por ejemplo, el Informe de prospección y detección de necesidades formativas del Observatorio de las Ocupaciones del SEPE, o el Observatorio Profesional del Instituto Nacional de las Cualificaciones y su Red de Alerta. Para más detalles, véase: Instituto Nacional de las Cualificaciones. “El Observatorio Profesional del INCUAL.” Instituto Nacional de las Cualificaciones, <https://incual.mecd.es/el>

observatorioprofesional; Instituto Nacional de las Cualificaciones. “Red de alerta del Observatorio Profesional.” Instituto Nacional de las Cualificaciones, <https://incual.mecd.es/red-de-alerta>; y Servicio Público de Empleo Estatal. “Prospección y Detección de Necesidades Formativas.” Servicio Público de Empleo Estatal, <https://www.sepe.es/HomeSepe/que-es-elsepe/observatorio/necesidades-formativas/ver-resultados.html?documentType=prospecciones&..>

¹⁵³ Australian Government. “Skills Match.” Australian Government, <https://joboutlook.gov.au/career-tools/skills-match#/>.

¹⁵⁴ The analysis of the hypothetical alternative involves the study of the employment trajectories of a group of people who have followed a training course with another - control - group of people with similar characteristics who have not followed the course. See: Kluve, Jochen. “The Effectiveness of European Active Labor Market Programs.” *Labour Economics* 17, n.º 6, 2010. <https://doi.org/10.1016/j.labeco.2010.02.004>.

¹⁵⁵ Republic of Korea. *Lifelong Education Act 2009*. 2009. <https://uil.unesco.org/document/republic-korea-lifelong-education-act-2009-issued-2009>.

¹⁵⁶ Republic of Uruguay. *EC 1139, Ley 18.437*. 2008. <http://www.unesco.org/education/edurights/media/docs/58baed0210eec2bac6760c53f1316bfa470a2e99.pdf>

¹⁵⁷ See UNESCO’s collection of lifelong learning policies and strategies: UNESCO Institute for Lifelong Learning. *Collection of Lifelong Learning Policies and Strategies*. 2020. <https://uil.unesco.org/lifelong-learning/lifelong-learning-policies/policies>

¹⁵⁸ UNESCO. *2ndo Informe Mundial sobre El Aprendizaje y La Educación de Adultos: Repensar la Alfabetización a lo Largo de Toda la Vida*: Hamburg, Germany: UNESCO Institute for Lifelong Learning, 2013. <https://unesdoc.unesco.org/ark:/48223/pf0000225875>

¹⁵⁹ Participation in *lifelong learning* is closely linked to the breadth of learning options available. The more courses, the more participation. See: Stenberg, Anders. “Comprehensive Education for the Unemployed – Evaluating the Effects on Unemployment of the Adult Education Initiative in Sweden.” *Labour* 19, n.º 1, 2005. <https://doi.org/10.1111/j.1467-9914.2005.00293.x>.

¹⁶⁰ European Commission. *Employment and Social Developments in Europe in 2018. Annual Review 2018*. Luxembourg: Publications Office of the European Union, 2018. <https://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=8110>

¹⁶¹ CEDEFOP. *European guidelines for validating non-formal and informal learning*. Luxembourg: Publications Office of the European Union, 2016. https://www.cedefop.europa.eu/files/3073_en.pdf

¹⁶² France, for example, the 2002 Law on Social Modernisation (art. 134) stipulates that all persons with at least three years of experience are entitled to recognition of knowledge gained in practice. See: Légifrance. *LOI n° 2002-73 du 17 janvier 2002 de modernisation sociale*. <https://www.legifrance.gouv.fr/eli/loi/2002/1/17/MESX0000077L/jo/texte>

¹⁶² Official Gazette of the Basque Country. *RESOLUCIÓN de 30 de julio de 2020, del Viceconsejero de Formación Profesional y del Director General de Lanbide-Servicio Vasco de Empleo, por la que se convoca el procedimiento de evaluación y acreditación de las competencias*

profesionales adquiridas por la experiencia laboral o vías no formales de formación para el año 2020. 2020. [https://www.euskadi.eus/gobierno-vasco/-/eli/es-pv/res/2020/07/30/\(4\)/dof/spa/html/](https://www.euskadi.eus/gobierno-vasco/-/eli/es-pv/res/2020/07/30/(4)/dof/spa/html/)

¹⁶³ In France, for example, the 2002 Law on Social Modernisation (art. 134) stipulates that all persons with at least three years of experience are entitled to recognition of knowledge gained in practice. See: Légifrance. *LOI n° 2002-73 du 17 janvier 2002 de modernisation sociale*. <https://www.legifrance.gouv.fr/eli/loi/2002/1/17/MESX0000077L/jo/texte>

¹⁶⁴ Kompetanse Norge. “Validation of prior learning.” Kompetanse Norge, <http://www.vox.no/English/Validation-of-prior-learning/>

¹⁶⁵ For more information, see: Mon Compte Formation, <https://www.moncompteactivite.gouv.fr/cpa-public/> and Skills Future, <https://www.skillsfuture.gov.sg/AboutSkillsFuture>

¹⁶⁶ European Commission. “El portal EURES de la movilidad profesional.” European Commission, <https://ec.europa.eu/eures/public/es/homepage>

¹⁶⁷ European Commission. “ERASMUS+” European Commission, https://ec.europa.eu/programmes/erasmus-plus/node_es

¹⁶⁸ Department of Education and Vocational Training. *Plan de Modernización de la Formación Profesional*. 2020. https://www.lamoncloa.gob.es/serviciosdeprensa/notasprensa/educacion/Documents/2020/220720-Plan_modernizacion_FP.pdf

¹⁶⁹ Studies show that in countries where there is more on-the-job training, there is higher participation in adult education. See: Groenez, Steven, Ella Desmedt, and Ides Nicaise. “Participation in Lifelong Learning in the EU-15: The Role of Macro- Level Determinants.” *Paper presented in the ECPR Conference*, 2007. https://limo.libis.be/primo-explore/fulldisplay?docid=LIRIAS1896929&context=L&vid=Lirias&search_scope=Lirias&tab=default_tab&lang=en_US&fromSitemap=1

¹⁷⁰ Hampf, Franziska, and Ludger Woessmann. “Vocational vs. General Education and Employment over the Life-Cycle: New Evidence from PIAAC.” NBER Working Paper, n.º 10298, 2016. <http://ftp.iza.org/dp10298.pdf>

¹⁷¹ Percentage of graduates who get a job in the first 12-24 months after graduation.