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OECD Higher Education Programme (IMHE)

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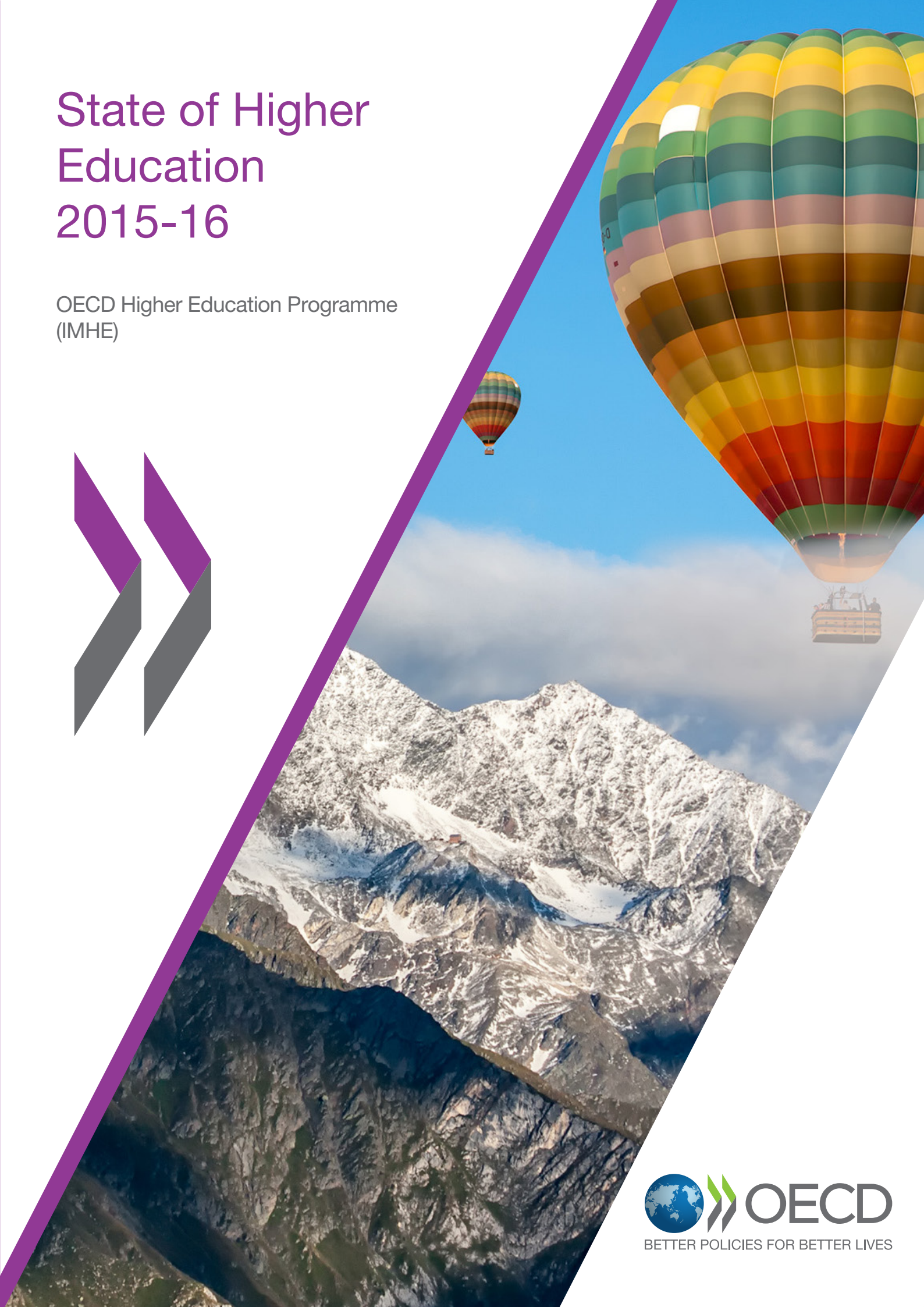
STATE OF HIGHER EDUCATION

2015-16

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CHAPTER 1 – HIGHER EDUCATION TODAY

Cláudia Sarrico

Introduction

The expansion in tertiary attainment over the generations has been significant. In most OECD and partner countries, the share of younger adults with higher education qualifications is larger than that of older adults with that level of qualification. Based on current patterns of graduation, more than half of young adults in OECD countries are expected to enter a bachelor's degree, and almost a quarter are expected to enter a master's degree or equivalent programme over their lifetime.

There are large incentives for people to attend higher education. Educational attainment has a strong positive relationship to skill proficiency. Adults with tertiary-level qualifications have significantly better literacy and numeracy skills, on average, over adults with secondary education. This is expected, as adults who have completed tertiary education will have spent longer in education and received higher levels of instruction than their less-qualified peers. Due to the processes of selection, through which access to higher levels of education is determined, adults with higher levels of qualifications are also more likely to be those who generally have greater ability, interest in and motivation for study.

In addition, completing higher levels of education often provides access to jobs that involve higher levels of further learning and information-processing tasks. People with higher levels of education are more likely to be employed, and remain employed, and have more opportunities to gain experience on the job. Also, higher educational attainment is associated with higher earnings during a person's working life.

The benefits of education are not only financial. More highly educated adults tend to be more engaged in the world around them. Adults with higher qualifications are more likely to report desirable social outcomes, including good or excellent health, participation in volunteer activities, interpersonal trust, and political efficacy. Not only does education pay off for individuals, but the public benefits of education, in greater tax revenue and social contributions from a larger proportion of higher education graduates, also outweigh the cost.

Improved literacy and numeracy skills narrow the labour market outcomes gap between individuals with different levels of formally recognised education, but do not close it completely (Lane and Conlon, 2016). Degrees and qualifications are signals that matter in the labour market.

In times of higher education massification, how reliable are those signals? Has the dramatic increase of higher education attainment in the recent past, along with investment in higher education, witnessed a commensurate increase in the skill levels of adults in our countries? In other words, has quality accompanied quantity? For a long time it has been difficult to answer this question, as data on higher education graduate skill outcomes is virtually non-existent. By contrast, the school sector has had the OECD Programme for

International Student Assessment (PISA) to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students, since 2000.

So far, there has not been a similar programme to systematically directly measure higher education student learning outcomes. This presents a problem: "Without data on learning outcomes, judgements about the quality of teaching and learning at higher education institutions (HEIs) will continue to be made on the basis of flawed rankings, derived not from outcomes, nor even outputs – but from idiosyncratic inputs and reputation surveys." (Schleicher, 2015).

The OECD Survey of Adult Skills, part of the Programme for the International Assessment of Adult Competencies (PIAAC), has been able to provide us with some insights recently through its data on numeracy, literacy and problem-solving skills in technology-rich environments for adults (16-64 year-olds). The first results from the Survey were released in 2013. The Survey is not dedicated to the learning outcomes of higher education graduates, but it is possible to analyse a subset for that subpopulation. PIAAC data for young graduates shows that attainment does not always translate into skill proficiency. In fact, there is significant variability of skill levels by country, and some higher education graduates possess much lower basic skills than would be expected for this level of education. A lowering of skill proficiency at graduate level will threaten labour market and social outcomes, and consequently returns to investment for individuals and society.

This chapter aims to analyse the link between attainment and skill proficiency, make the skills of higher education graduates visible, and discuss how to deal with low skills among graduates. It departs from the data and analysis of *Education at a Glance* (OECD, 2015a), *OECD Skills Outlook* (OECD, 2013, 2015b), and *Building Skills for All: A Review of England* (Kuczera et al., 2016).

The first section describes the expansion of higher education, with higher participation, attainment, and associated significant levels of expenditure. The second section discusses the benefits of higher education for the average student, which justifies the considerable private and public investment in higher education. The third section examines the link between attainment and skill proficiency, before moving to the question in the fourth section whether at some point more expansion can hinder skill proficiency. The final section offers some ideas on how to deal with the issue of low skills among graduates.

The expansion of higher education

Participation and attainment

Higher education grew quickly from an elite to a mass system. In all OECD and partner countries, except Israel and South Africa, the share of younger adults (25-34 year-olds) with tertiary qualifications is larger than that of older adults (55-64 year-olds) with that level of qualification. On average, the difference between the generations in tertiary attainment is about 16 percentage points.

Across OECD countries, on average, 16% of 25-64 year-olds have earned a bachelor's degree or equivalent, 11% have earned a master's degree, and about 1% has earned a doctoral degree or equivalent.

Based on current patterns of graduation, an average of 35% of today's young people across OECD countries is expected to graduate from tertiary education at least once before the age of 30, some 57% are expected to enter a bachelor's degree or equivalent programme, and 22% are expected to enter a master's degree or equivalent programme over their lifetime.

On average across OECD countries, 54% of new entrants into tertiary education are women, and 82% are under the age of 25. In addition, some 13% of all entrants are international students.

Expenditure

The expansion of higher education translates necessarily in substantive investment in this level of education. However, there is a large variation in spending in different countries, and the relationship between countries' relative wealth and their expenditure levels varies as well. Nonetheless, expenditure on tertiary education amounts to at least 1% of GDP in nearly all countries (Figure 1.1:).

Figure 1.1: Expenditure on tertiary educational institutions as a percentage of GDP (2012) from public and private sources
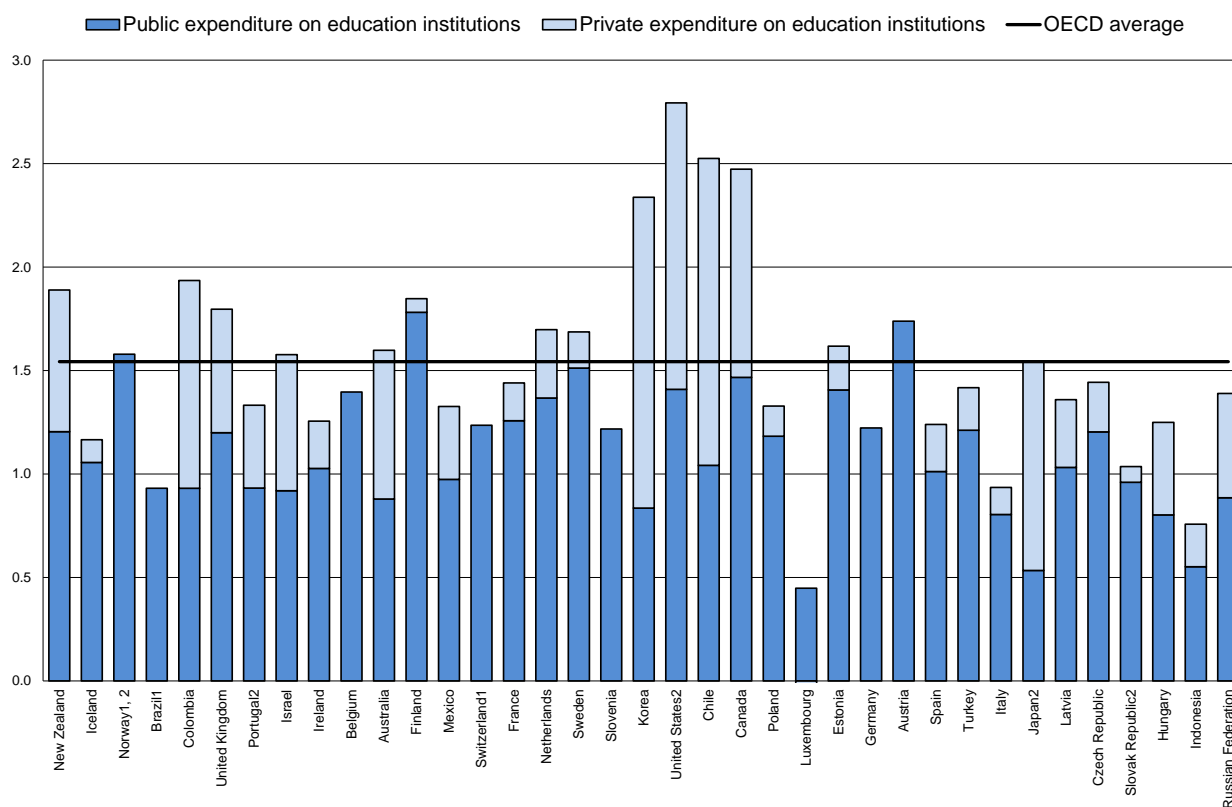
1. Public expenditure only (for Switzerland, in tertiary education only; for Norway, in primary, secondary and post-secondary non-tertiary education only).

2. Some levels of education are included with others. Refer to "x" code in Table B1.1a for details.

Countries are ranked in descending order of expenditure from both public and private sources on educational institutions in primary, secondary and post-secondary non-tertiary education.

Source: OECD. Table B2.3. See Annex 3 for notes (www.oecd.org/education/education-at-a-glance-19991487.htm).

On average, OECD countries spend around two-thirds more per student at the tertiary level than at the primary, secondary and post-secondary non-tertiary levels. R&D activities or ancillary services can account for a significant proportion of expenditure at the tertiary level (an average of 32% of total expenditure per student). However, when these are excluded, expenditure per student on core educational services at the tertiary level is still, on average, 21% higher than at the primary, secondary and post-secondary non-tertiary levels.

At the tertiary level, spending per student increased between 2000 and 2012 in most countries. However, since the beginning of the economic crisis in 2008, expenditure on tertiary institutions has decreased in 7 of the 32 countries with available data. This led to a drop in expenditure per student in all of these countries,

with the exception of Italy and Russia where tertiary enrolment fell even faster (Figure 1.2:). Expenditure per student also fell in some countries, where the increase in the number of students was faster than the corresponding increase in expenditure (France, Mexico, Australia, Belgium, USA, Brazil).

Figure 1.2: Changes in the number of students, expenditure on educational institutions and expenditure per student in tertiary education (2008, 2012). Index of change between 2008 and 2012 (2008 = 100, 2012 constant prices)

1. Public expenditure only.
2. Public institutions only.
3. Some levels of education are included with others. Refer to "x" code in Table B1.1a for details.
Countries are ranked in descending order of change in expenditure per student by educational institutions.
Source: OECD. Tables B1.5a and B1.5b. See Annex 3 for notes (www.oecd.org/education/education-at-a-glance-19991487.htm).

Cost-sharing

Many countries have similar goals for tertiary education, such as strengthening the knowledge economy, through increasing access for students and boosting completion rates. At the same time, they want to ensure the financial stability of their higher education systems. However, OECD countries differ dramatically in the way the cost of higher education is shared among governments, students and their families, and other private entities – and in the financial support they provide to students.

Education, at all levels, is mostly publicly funded, but the tertiary sector, in comparison to other educational sectors, obtains the largest proportion of funds from private sources, such as households and private enterprises: around 30% on average for OECD countries (Figure 1.3). Between 2000 and 2012, private expenditure on tertiary education institutions generally increased faster than public expenditure. The average share of public funding for tertiary institutions decreased from 69% in 2000, to 64% in 2012. Nevertheless, as

seen above, public investment in tertiary education also increased in most countries for which 2000 and 2012 data are available, regardless of the changes in private spending.

Figure 1.3: Share of private expenditure on tertiary education institutions (2005 and 2012)

1. Some levels of education are included w ith others. Refer to "x" code in Table B1.1a for details.
Countries are ranked in descending order of the share of private expenditure on educational institutions in 2012.
Source: OECD. Table B3.2b. See Annex 3 for notes (w w w .oecd.org/education/education-at-a-glance-19991487.htm).

The fact that higher education is able to attract a significant share of private funding may make it better able to cope with austerity measures in terms of public funding in some countries, and ensure adequate funding levels in general. However, private funding of tertiary education comes mainly from households (Figure 1.4), raising concerns about equity of access to education. OECD countries differ significantly in the amount of tuition fees charged to students, but increasingly students are being asked to pay fees, or higher fees, in publicly funded institutions.

Some stakeholders are concerned that the balance between public and private funding may become so tilted as to discourage potential students from entering tertiary education. Some believe that countries should significantly increase public support to students, while others support efforts to increase the amount of funding to tertiary education provided by private enterprises.

Figure 1.4: Distribution of public and private expenditure on educational institutions (2012)
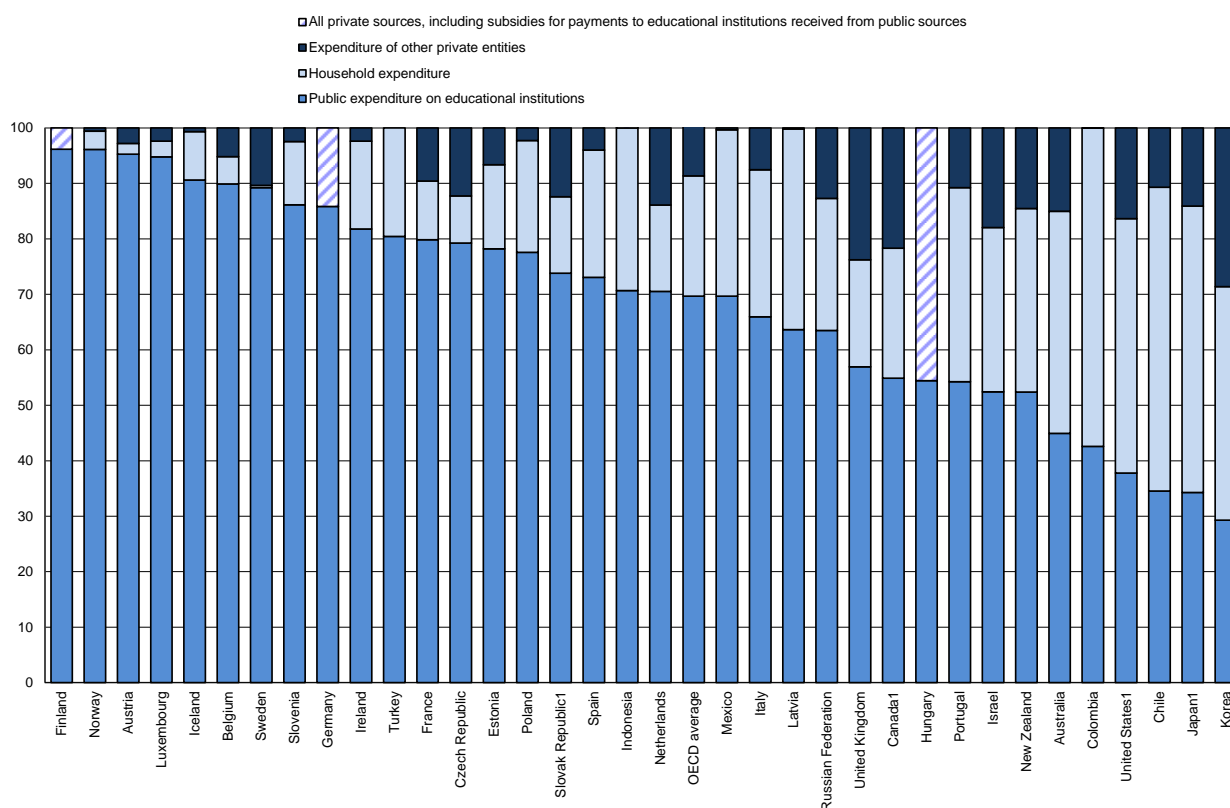
□ All private sources, including subsidies for payments to educational institutions received from public sources
■ Expenditure of other private entities
□ Household expenditure
■ Public expenditure on educational institutions

1. Some levels of education are included with others. Refer to "x" code in Table B1.1a for details.
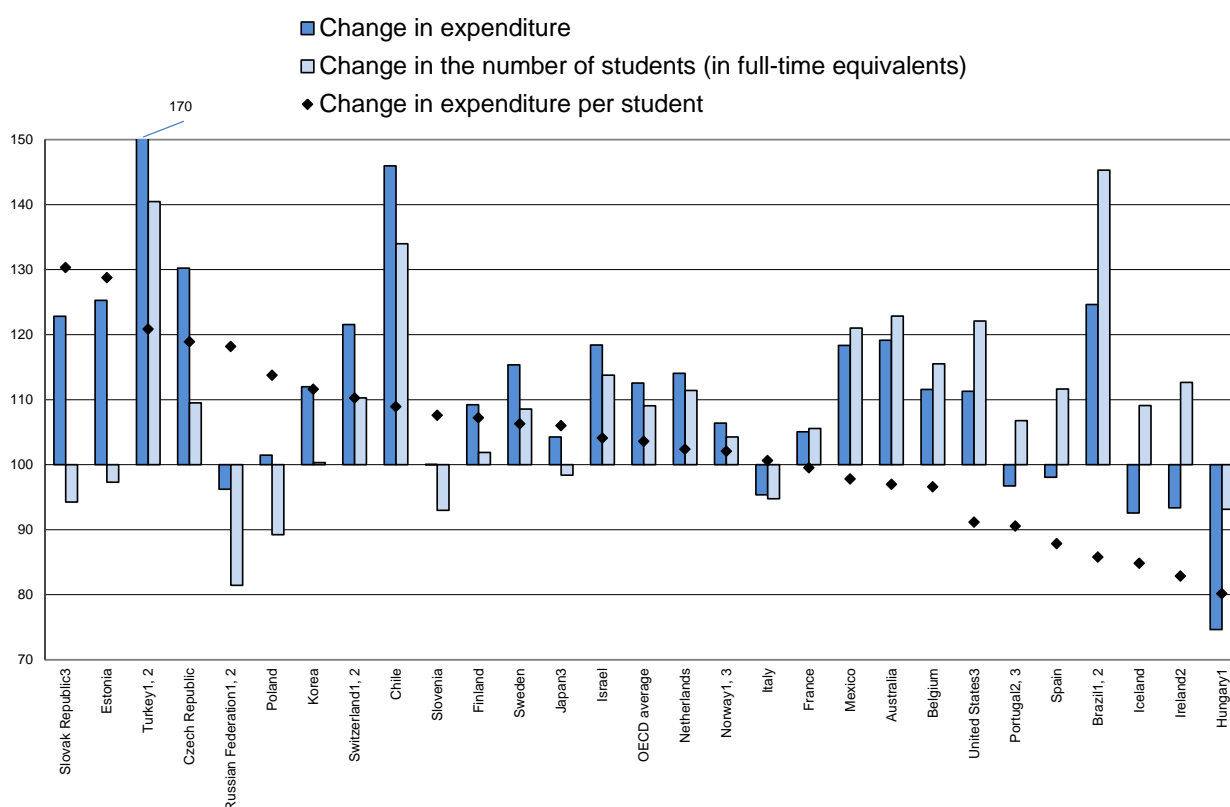*Countries are ranked in descending order of the proportion of public expenditure on educational institutions*
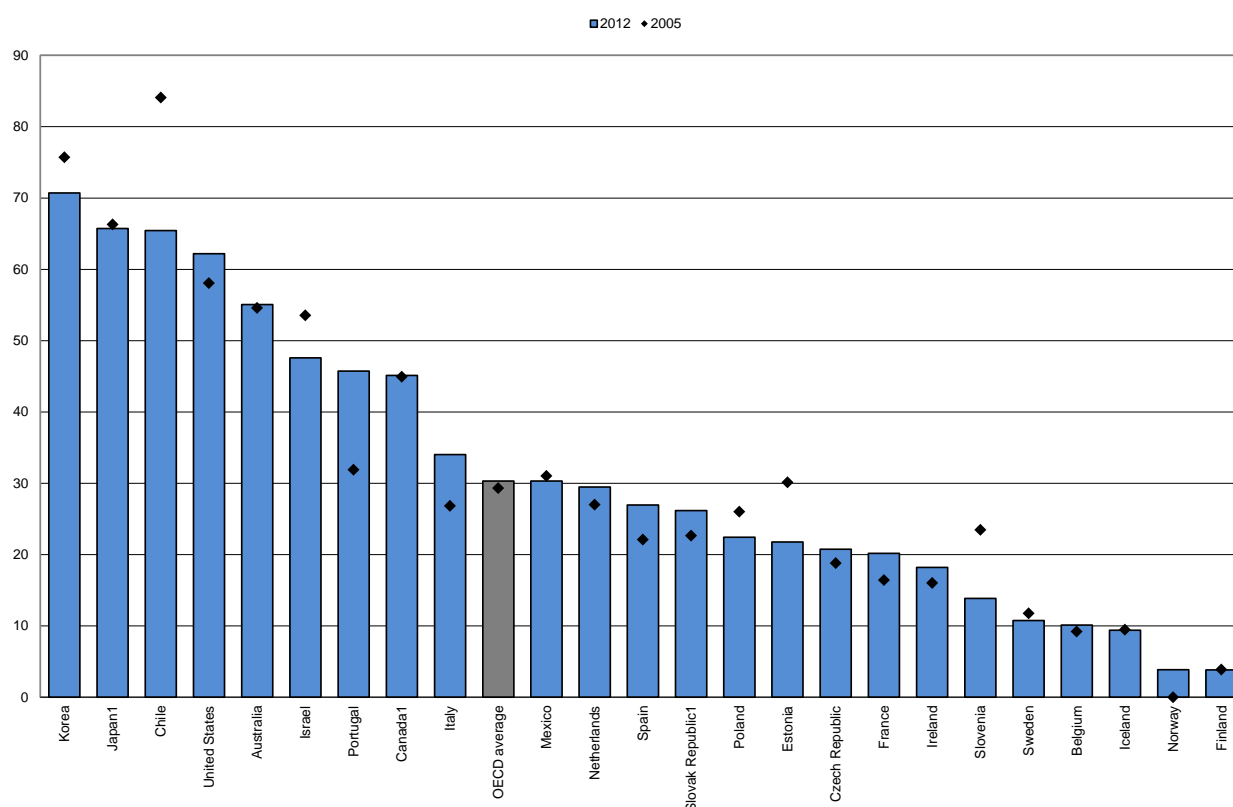**Source:** OECD. Table B3.1. See Annex 3 for notes (www.oecd.org/education/education-at-a-glance-19991487.htm).

As seen above, public funding for tertiary education increased between 2000 and 2012 in nearly all countries for which comparable data are available. However, more households are sharing the cost of education, thus private funding increased at an even greater rate in more than three-quarters of countries. This trend is mainly influenced by some European countries, where there were significant changes in tuition fees and where enterprises participate more actively in providing grants to finance tertiary institutions.

High private returns to tertiary education suggest that a greater contribution to the costs of education by individuals and other private entities may be justified, as long as there are ways to ensure that funding is available to students regardless of their economic backgrounds.

Research seems to show no strong relationship between levels of tuition fees and participation in tertiary education (OECD, 2008). However, among countries with high tuition fees, student financial support systems that offer loans with income-contingent repayment combined with means-tested grants may help to promote access and equity while sharing the costs of higher education between the state and students.

On the other hand, lower tuition fees can help to promote student access and equity in higher education, particularly among disadvantaged populations, who may be particularly impacted by the upfront costs or are more susceptible to "sticker shock". However, they may also constrain the ability of tertiary institutions to maintain an appropriate quality of education, especially in light of the massive expansion of tertiary education

in all OECD countries in recent years. Moreover budgetary pressures stemming from the global economic crisis may make it more difficult for countries that have lower tuition fees to sustain this model in the future.

In all OECD countries, people with a master's, doctoral or equivalent degree have better labour market opportunities compared to those with only a bachelor's degree. However, in one-third of OECD countries, tuition fees charged by public institutions for master's and doctorate or equivalent programmes are not much higher than those charged for bachelor's degree programmes.

An increasing number of OECD countries charge higher tuition fees for international students than for national students, and many also differentiate tuition fees by field of education, largely because of the relevance of the different qualifications on the labour market.

Policy decisions relating to tuition fees affect both the cost of tertiary education to students and the resources available to tertiary institutions. Tuition fees paid by students and their families can play a significant role in funding tertiary education institutions and also affect decisions to enrol in tertiary programmes within the country or abroad. As such, policies relating to cost-sharing play an important role in the performance of HEIs.

Grants and loans

Evidence suggests that having a robust financial support system is important for ensuring good outcomes for students in higher education, and that the type of aid is also critical (OECD, 2008). A key question in many OECD countries is whether financial support for students in tertiary education should be provided primarily in the form of grants or loans. Governments support students' living or educational costs through different combinations of these two types of support.

Advocates of student loans argue that loans allow available resources to be spread further. If the amount spent on grants were used to guarantee or subsidise loans instead, more aid would be available to more students, and overall access to higher education would increase.

However, given the dramatic expansion of higher education, one important question is whether some future graduates will realise enough returns to their education to be able to repay their loans.

The benefits of higher education

This section provides evidence that, for the average graduate, higher education pays, both financially and socially, for the individual as well as society. These facts are good arguments for the significant expenditure, both private and public, on higher education.

Participation in the labour market

Across OECD countries, tertiary-educated adults have the best outcomes in the labour market. On average, over 80% of tertiary-educated people are employed compared with over 70% of people with an upper secondary or post-secondary non-tertiary education and less than 60% of people with below upper secondary education.

Across all countries for which data is available, having a tertiary education reduces the risks of being unemployed (Figure 1.5). On average, 5.1% of adults with tertiary education are unemployed compared with 7.7% of adults with upper secondary or post-secondary non-tertiary education, and 12.8% of adults with below upper secondary education.

Figure 1.5: Unemployment rates, by educational attainment (2014), 25-64 year-olds
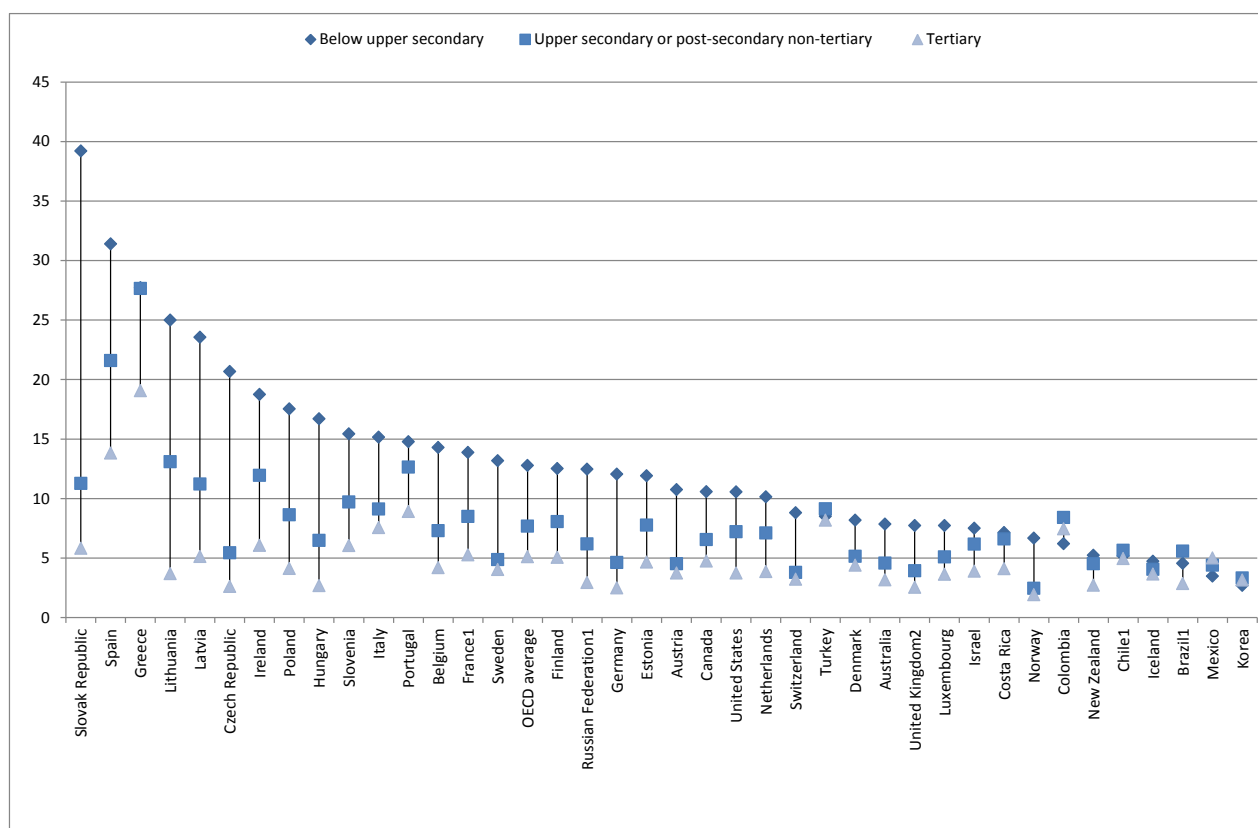
In general, the higher the level of educational attainment is, the higher the employment rate and the lower the unemployment rate are. This holds true for the various levels within tertiary education, as well. In OECD countries, the employment rate among adults with a short-cycle tertiary qualification or bachelor's or equivalent degree is about 10 percentage points lower than the employment rate among adults with a doctoral or equivalent degree (79%, 82% and 91%, respectively), while the respective unemployment rates are about two percentage points higher (5.1%, 5.6% and 3.4%, respectively). Most of the current and likely future job creation will be in occupations that require some form of tertiary education, which represents another powerful incentive to pursue tertiary education.

Earnings advantages

In all OECD countries, adults with tertiary education earn more than adults with upper secondary education who, in turn, earn more than adults with below upper secondary education. Since private investment costs beyond upper secondary education rise considerably in most countries, a high earnings advantage is an important incentive for individuals to invest time and money in further education.

Earnings differentials between adults with tertiary education and those with upper secondary education are generally more pronounced than the differentials between upper secondary and below upper secondary education. Across OECD countries, compared with adults with upper secondary education with income from employment, those without that level of education earn about 20% less, those with post-secondary non-tertiary education earn about 10% more, and those with a tertiary degree earn about 60% more. The 60% earnings advantage accrues only to those with a bachelor's or equivalent degree. Those with a short-cycle tertiary degree earn only about 25% more, but those with a master's, doctoral or equivalent degree earn more

than twice as much as those with upper secondary education as their highest level of attainment. The results show that continuing tertiary education after a bachelor's degree pays off (Figure 1.6).

Figure 1.6 Relative earnings of tertiary-educated workers, by level of tertiary education (2013), 25-64 year-olds with income from employment; upper secondary education = 100
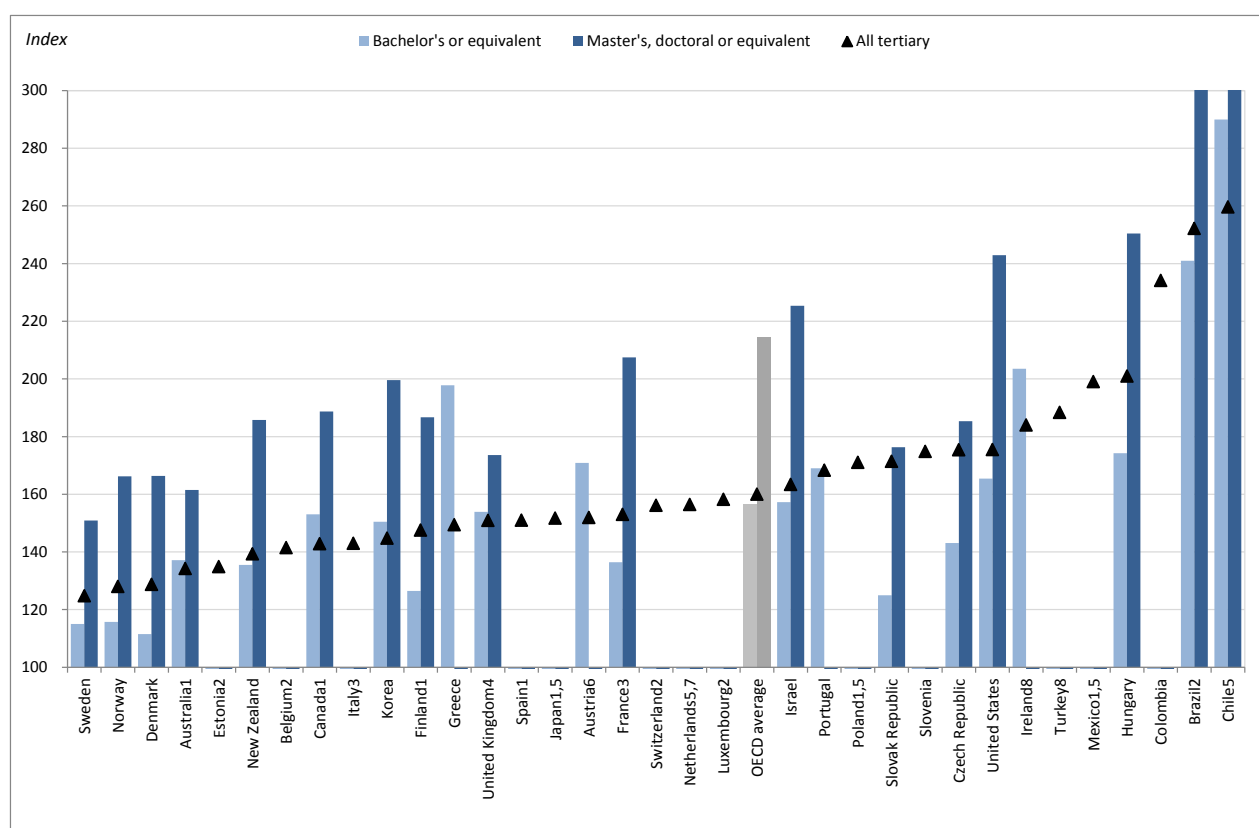
Note: Tertiary education includes short cycle tertiary, bachelor's, master's, doctoral or equivalent degrees.

1. Australia, Canada, Finland, Japan, Mexico, Poland, Spain: Year of reference 2012.
2. Belgium, Brazil, Estonia, Luxembourg, Switzerland: Index 100 refers to the combined ISCED levels 3 and 4 of the educational attainment levels in the ISCED 2011 classification.
3. Chile, France, Italy: Year of reference 2011.
4. The United Kingdom: Data for upper secondary attainment includes completion of a sufficient volume and standard of programmes that would be classified individually as completion of intermediate upper secondary programmes (18% of the adults are under this group).
5. Japan, Mexico, the Netherlands, Poland: Index 100 refers to the combined ISCED levels 3 and 4 of the educational attainment levels in the ISCED-97 classification.
6. Austria: Master's, doctoral or equivalent are included in Bachelor's or equivalent.
7. The Netherlands: Year of reference 2010.
8. Ireland, Turkey: Earnings net of income tax.
Countries are ranked in ascending order of the relative earnings of 25-64 year-olds with tertiary education.
Source: OECD. Table A6.1a. See Annex 3 for notes (www.oecd.org/education/education-at-a-glance-19991487.htm).

About 25% of tertiary-educated individuals earn more than twice the median. They are substantially less likely to be in the low-earnings category than those with below upper secondary education. About 10% of tertiary-educated workers earn at or below half the median, compared with about 25% of workers with below upper secondary education.

The earnings advantages are largest in countries with a small share of tertiary-educated people, such as Brazil, Chile, Colombia, Hungary and Mexico, whereas earnings advantages are smallest in countries with a large share of tertiary-educated people, such as Norway and Sweden.

Financial returns

Adults completing tertiary education benefit from substantial returns on investment: they are more likely to be employed and earn more than adults without tertiary education do. Not only does education pay off for individuals, but the public benefits of education, in greater tax revenues and social contributions from a larger proportion of tertiary-educated adults, also outweigh the cost.

Across OECD countries, the net public return on investment for a woman with tertiary education is USD 65,500 over her lifetime – 1.2 times the public cost of investment in her education. For a man, the net public return is over USD 127,400, which is almost 2.5 times the public cost of investment in his education.

Both private and public returns to tertiary education are higher than returns to upper secondary and post-secondary non-tertiary education.

Private returns

On average across OECD countries, the financial return to tertiary education is substantial (Figure 1.7). The calculated financial return to tertiary education for a single worker with no children is around twice as large as the returns to such a person with upper secondary or post-secondary non-tertiary education as his or her highest level of attainment.

Figure 1.7: Private costs and benefits of education for a woman, by educational attainment (2011). In equivalent USD converted using PPPs for GDP
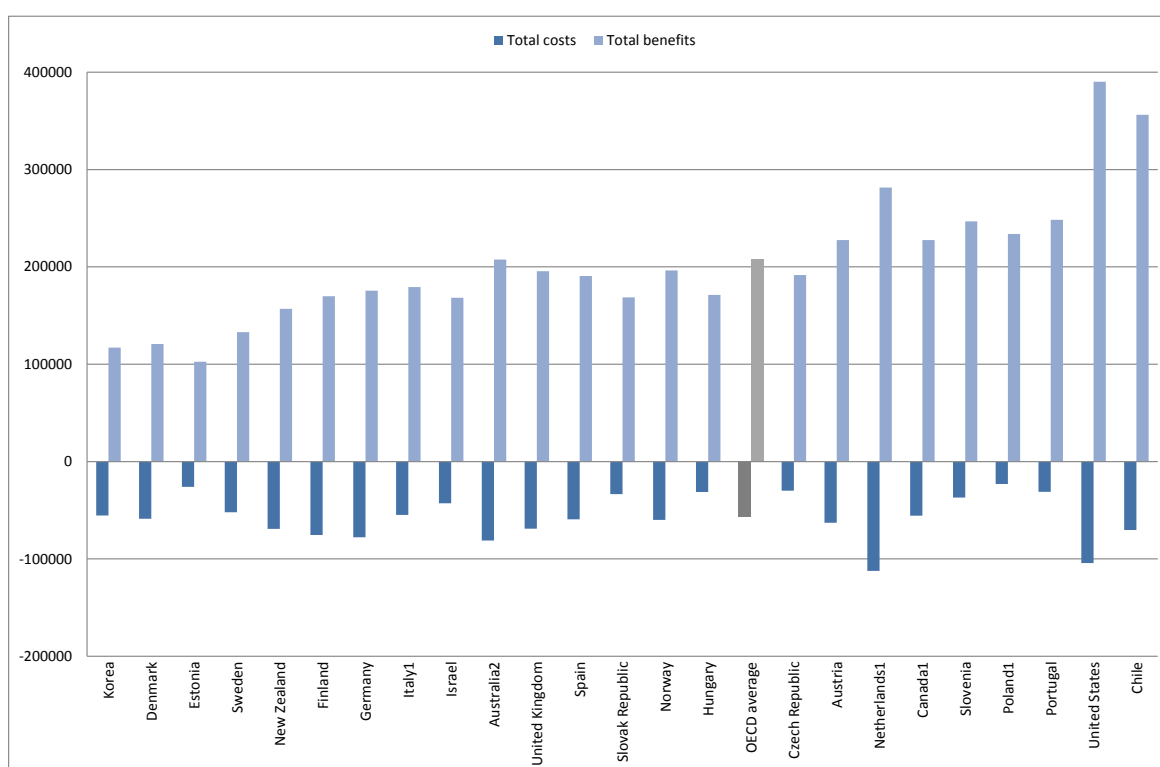
1. Canada, Italy, Luxembourg, the Netherlands, Poland: Year of reference 2010.
2. Australia: Year of reference 2009.
Countries are shown in ascending order of net financial private returns
Source: OECD. Tables A7.1b and A7.3b. See Annex 3 for notes (www.oecd.org/education/education-at-a-glance-19991487.htm).

Across OECD countries, people invest around USD 55,000 to earn a tertiary degree. In the Netherlands and the United States, average investment exceeds USD 100,000 when direct and indirect costs are taken into account.

While they are the most visible part of the total cost of education, direct costs of education represent only a small share of this cost (20% of the total cost, on average, for tertiary education). The main costs are the foregone earnings – what a student could potentially earn if not in school. Foregone earnings vary substantially across countries, depending on the length of education, earnings levels and the difference in earnings across levels of educational attainment.

In general, further education yields higher earnings over a lifetime. A woman with upper secondary or postsecondary non-tertiary education as her highest level of attainment can expect to earn USD 151,800 more in gross earnings than a woman with a lower level of attainment over the course of her life. A tertiary educated woman can expect to earn USD 332,600 more in gross earnings than a woman with upper secondary or post-secondary non-tertiary education. On average, the gross earning benefits from tertiary education are double the gross earning benefits from upper secondary or post-secondary non-tertiary education for both men and women. Earnings premiums from higher educational attainment are greater for men than for women. Gross earnings benefits for men are 40% higher than for women from both upper secondary or postsecondary non-tertiary and tertiary education.

Public returns

Investments in education generate public returns as tertiary-educated adults pay higher income taxes and social insurance payments and require fewer social transfers (Figure 1.8).

Tertiary education for a woman in OECD countries costs an average of USD 53,900. On average across OECD countries, the net public return for a woman attaining tertiary education is USD 65,500, relative to USD 48,000 for a woman attaining upper secondary or post-secondary non-tertiary education.

Figure 1.8: Public costs and benefits of education for a woman, by educational attainment (2011). In equivalent USD converted using PPPs for GDP
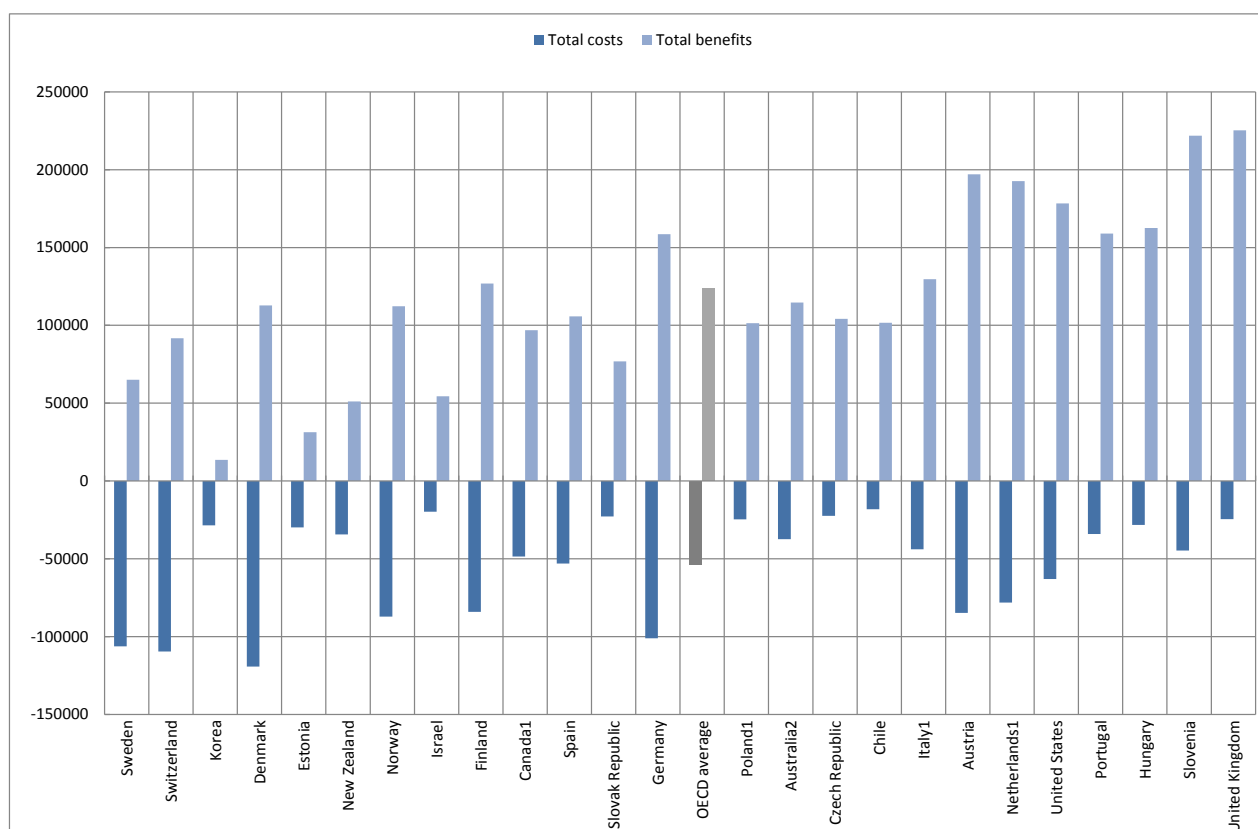
1. Canada, Italy, Luxembourg, the Netherlands, Poland: Year of reference 2010.

2. Australia: Year of reference 2009.

Countries are shown in ascending order of net financial public returns

Source: OECD. Tables A7.2b and A7.4b. See Annex 3 for notes (www.oecd.org/education/education-at-a-glance-19991487.htm).

The largest public gains in tax and social security benefits from higher education are most often found in countries where earnings differentials are large, or where average earnings reach high income-tax brackets.

Social returns

The benefits of education are not only financial. Adults with higher educational attainment are more likely to report that they are in good health, that they participate in volunteer activities, that they trust others, and that they feel they have a say in government (Figure 1.9). In other words, more highly educated adults tend to be more engaged in the world around them.

Individuals thus have incentives to pursue more education, and governments have incentives to provide appropriate infrastructure and organisation to support the expansion of higher educational attainment across the population. Consequently, over the past decades, almost all OECD countries have seen significant increases in the educational attainment of their populations, especially among the younger generations.

Figure 1.9: Social outcomes related to education (2012). Survey of Adult Skills, average, 25-64 year-olds, upper secondary or post-secondary non-tertiary education as reference category
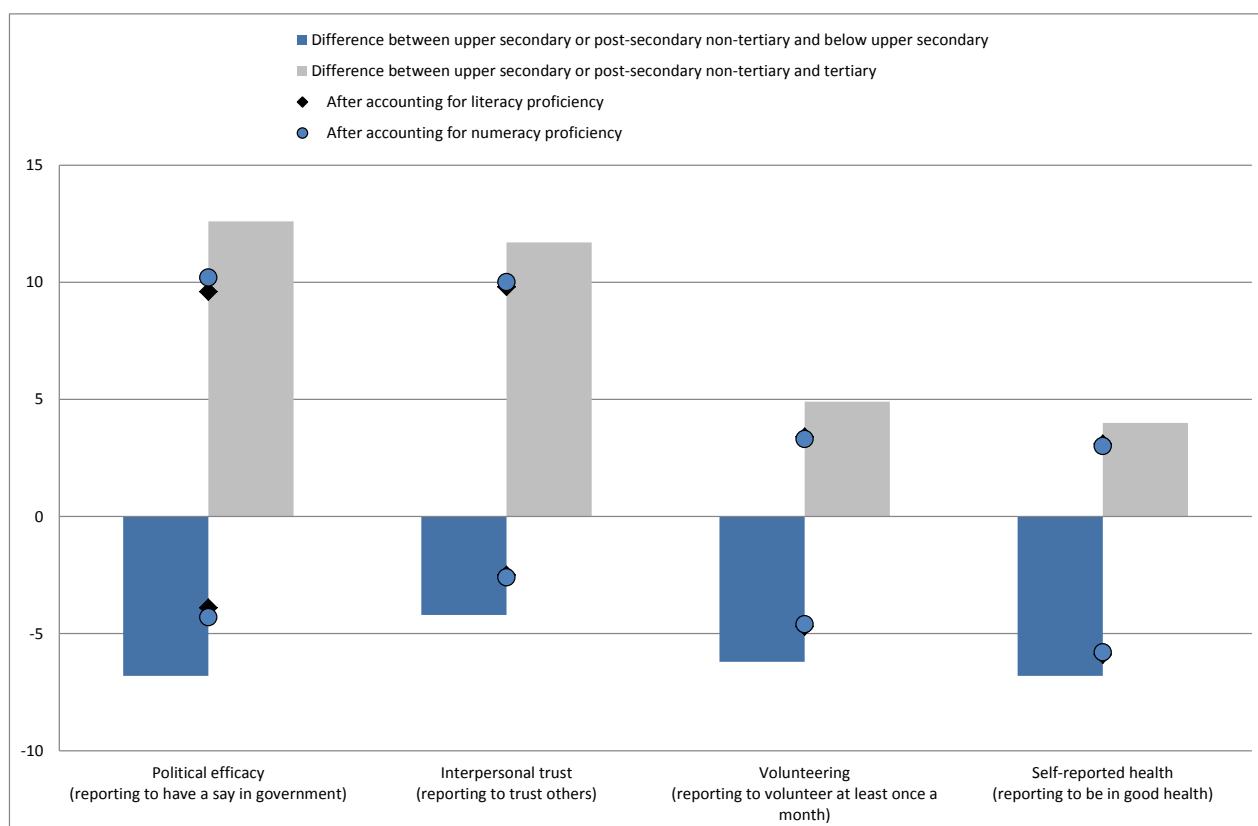
The proportion of adults who believe they have a say in government is 13 percentage points larger among adults with tertiary education than among adults with upper secondary or post-secondary non-tertiary education. There is a 12 percentage-point difference between these two groups when considering adults who reported that they trust others, a 5 percentage-point difference when considering adults who reported that they volunteer at least once a month, and a 4 percentage-point difference between the two groups of adults when considering adults who reported that they are in good health.

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CHAPTER 2 – MAKING THE SKILLS OF HIGHER EDUCATION GRADUATES MORE VISIBLE

Cláudia Sarrico

Higher education and skill proficiency

It is quite clear from the evidence provided in the previous chapter that, for the *average* graduate, attainment of higher education presents significant private and public benefits. Proficiency in literacy, numeracy and problem solving in technology-rich environments, like attainment of qualifications, is also positively and independently associated with the probability of participating in the labour market and being employed, and with higher wages.

An interesting question to investigate is how attainment relates to skills. As noted before, we do not have good measures of higher education learning outcomes, but the PIAAC survey can provide us some good insights.

How does attainment relate to skills?

Formal education plays a key role in developing skills. It is one of the main mechanisms through which proficiency in literacy, numeracy and problem solving is developed and maintained. Adults who have completed tertiary education will have spent more time in education and received higher levels of instruction than their less-qualified peers. Generally, adults with higher qualifications also have greater ability and motivation for study. Completing higher levels of education also often provides access to jobs that involve further learning and more information-processing tasks.

For all these reasons, it is not surprising, then, that the Survey of Adult Skills finds that educational attainment is positively related to skill proficiency. For example, adults with tertiary-level qualifications have an average 36 score-point lead on the literacy scale – the equivalent of about five years of formal schooling – over adults who have not completed secondary education, even after accounting for differences in their social background and age. This is close to the overall 46 score-point difference between the highest- and lowest-performing countries in the survey. But the skills gap between adults with tertiary education and those who have not completed secondary education varies considerably: in Canada and the United States, for example, it is over a third wider than it is in Australia, Austria, Estonia, Finland, Italy, Japan, Norway and the Slovak Republic.

While educational attainment is related to proficiency, skill levels vary considerably among individuals with similar qualifications. The Survey of Adult Skills shows that, in some countries, actual skill levels differ markedly from what data on formal qualifications would suggest. For example, Italy, Spain and the United States rank much higher internationally in the proportion of 25‑34 year‑olds with tertiary attainment than they do in literacy or numeracy proficiency among the same age group. Even more striking is that, on average, Japanese and Dutch 25-34 year-olds who have only completed high school easily outperform Italian or Spanish university graduates of the same age (Figure 2.1). The performance gaps observed across countries cannot be explained by the proportion of the age group attending tertiary education. In Austria and Germany, a comparatively small share of 25-34 year-olds are tertiary graduates, but that age group performs around the average on the literacy scale, while Japan has a large share of tertiary graduates who do very well.

Figure 2.1: Distribution of literacy proficiency scores and education in Italy and Japan. Mean literacy proficiency and distribution of literacy scores, by educational attainment
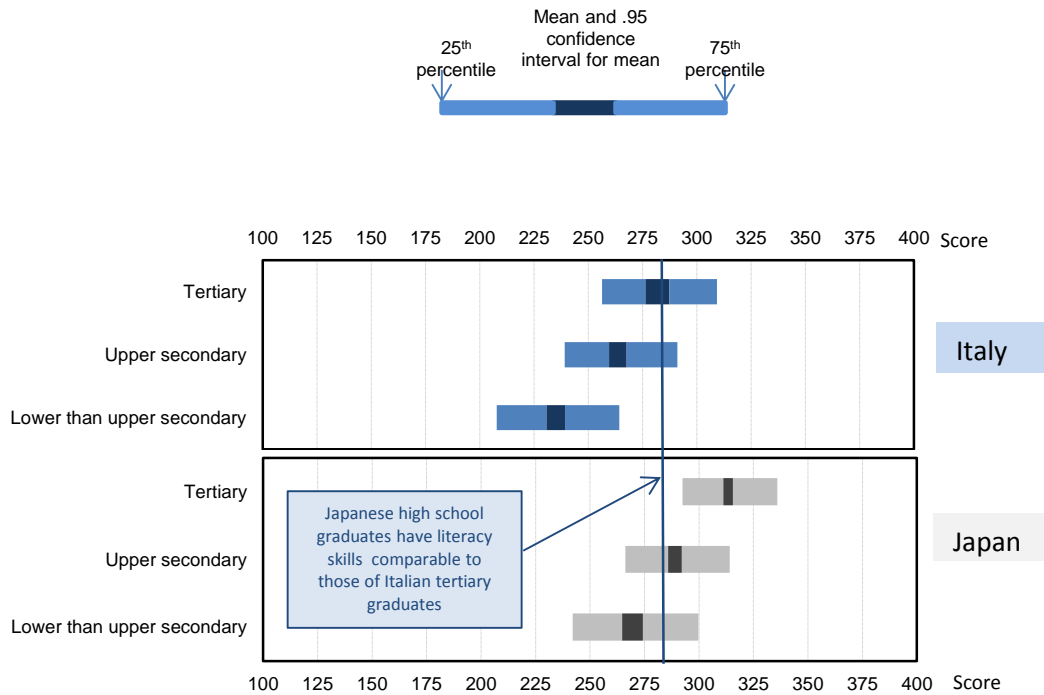
Source: Survey of Adult Skills (PIAAC) (2012)

In virtually all countries, significant shares of individuals with secondary education as their highest level of attainment outperform adults with a university degree. Skills and qualifications may diverge for several reasons. People may have acquired new skills since they completed their formal education or lost some skills that they did not use. Indeed, the longer a person is out of formal education, the weaker the direct relationship between his or her formal education and proficiency, and the greater the role of other factors that may affect proficiency, such as the work or social environment. In other words, a 55-year-old's experience in formal education is likely to have less of a direct impact on his or her proficiency than that of a 26-year-old.

But the survey results may also imply real differences in the relevance and quality of education in different countries, especially when we look at young graduates. The results of PIAAC reveal that, in all but one participating country, at least one in ten adults are proficient only at or below Level 1 in literacy or numeracy. Level 1 or below in literacy means those who can, at best, read relatively short texts to locate a single piece of information that is identical to the information given in the question or directive or to understand basic vocabulary. In other words, significant numbers of adults do not possess the most basic information-processing skills considered necessary to succeed in today's world. *Some of those adults are young higher education graduates*.

Effectiveness of higher education qualifications in terms of skills

The Survey of Adult Skills (PIAAC) was designed to provide insights into the availability of key skills in society and how they are used at work and at home. It directly measures proficiency in several information processing skills – namely literacy, numeracy and problem solving in technology-rich environments. The main findings of the survey regarding graduates are presented below.

Literacy and numeracy

As expected, there is a close positive relationship between educational attainment and proficiency in information processing skills. Beyond that, two other findings stand out. First, differences in skills proficiency related to educational attainment vary considerably among countries. The gap in average proficiency between adults with tertiary education and those who have not attained upper secondary education is considerably larger in some countries than in others. The United States stands out as having a particularly large gap between these two groups in both literacy and numeracy proficiency (Figure 2.2 and Figure 2.3).

Second, the proficiency of adults who have tertiary educational attainment varies substantially among countries. As discussed previously, in a few countries, the average proficiency of adults who have completed secondary education exceeds that of tertiary graduates. Accounting for the effects of socio-demographic characteristics, such as age, reduces the strength of the relationship between educational attainment and proficiency in all countries. However, the relationship remains strong, with between 25 and 45 score points separating the average literacy scores of adults with tertiary-level attainment and those with lower than upper secondary attainment, depending on the country. Interestingly, the adjusted differences in literacy proficiency between low- and high-educated adults do not vary greatly among countries. In other words, the gain in proficiency associated with having a tertiary qualification compared to having lower than upper secondary attainment is of similar magnitude irrespective of the differences in the structure and development of the different education and training systems.

Adults with tertiary-level qualifications have, on average, a 36 score-point advantage in literacy – the equivalent of five years of formal schooling – over adults who have completed lower-than-upper secondary education, after other characteristics have been taken into account (Figure 2.2). Adults with tertiary-level qualifications have, on average, a 42 score-point advantage in numeracy over adults who have completed lower-than-upper secondary education, after other characteristics have been taken into account (Figure 2.3), which is a bigger difference than for literacy.

Figure 2.2: Differences in literacy, by educational attainment

I. Mean literacy proficiency scores, by educational attainment
II. Mean literacy score differences between low- and high-educated adults
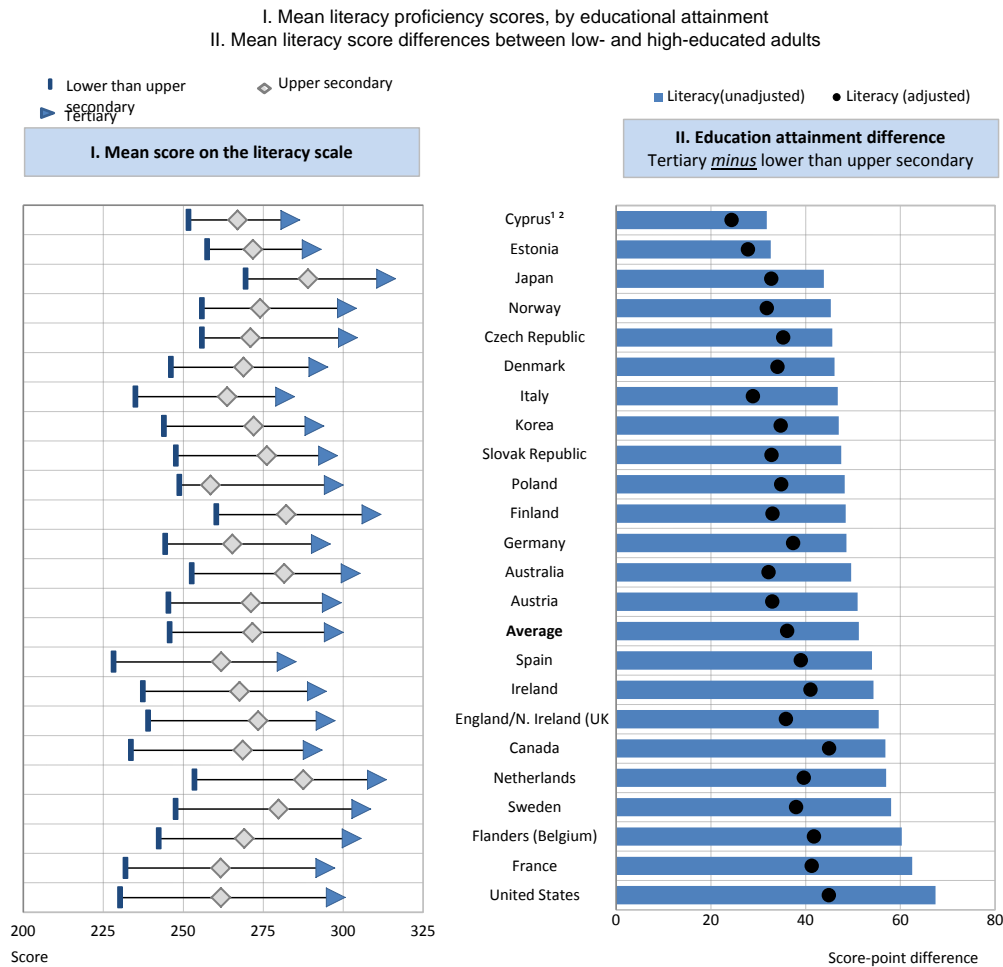
Countries are ranked in ascending order of the unadjusted differences in literacy scores (tertiary minus lower than upper secondary).

1. Note by Turkey:
The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

2. Note by all the European Union Member States of the OECD and the European Union:
The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Notes: All differences in Panel II are statistically significant. Unadjusted differences are the differences between the two means for each contrast category. Adjusted differences are based on a regression model and take account of differences associated with other factors: age, gender, immigration and language background, socio-economic background, and type of occupation. Only the score-point differences between two contrast categories are shown in panel II, which is useful for showing the relative significance of educational attainment vis-a-vis observed score-point differences. For more detailed regression results, including for each category of each variable included in the model, see table B3.17(L) in Annex B. Lower than upper seconday includes ISCED 1, 2 and 3C short. Upper secondary education includes ISCED 3A, 3B, 3C long and 4. Tertiary includes ISCED 5A, 5B and 6. Where possible, foreign qualifications are included as per their closest correspondance to the respective national education systems.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.1 (L) and Table A3.9 (L).

Figure 2.3: Differences in numeracy proficiency, by educational attainment

I. Mean numeracy proficiency scores, by educational attainment
II. Mean numeracy score difference between low- and high-educated adults
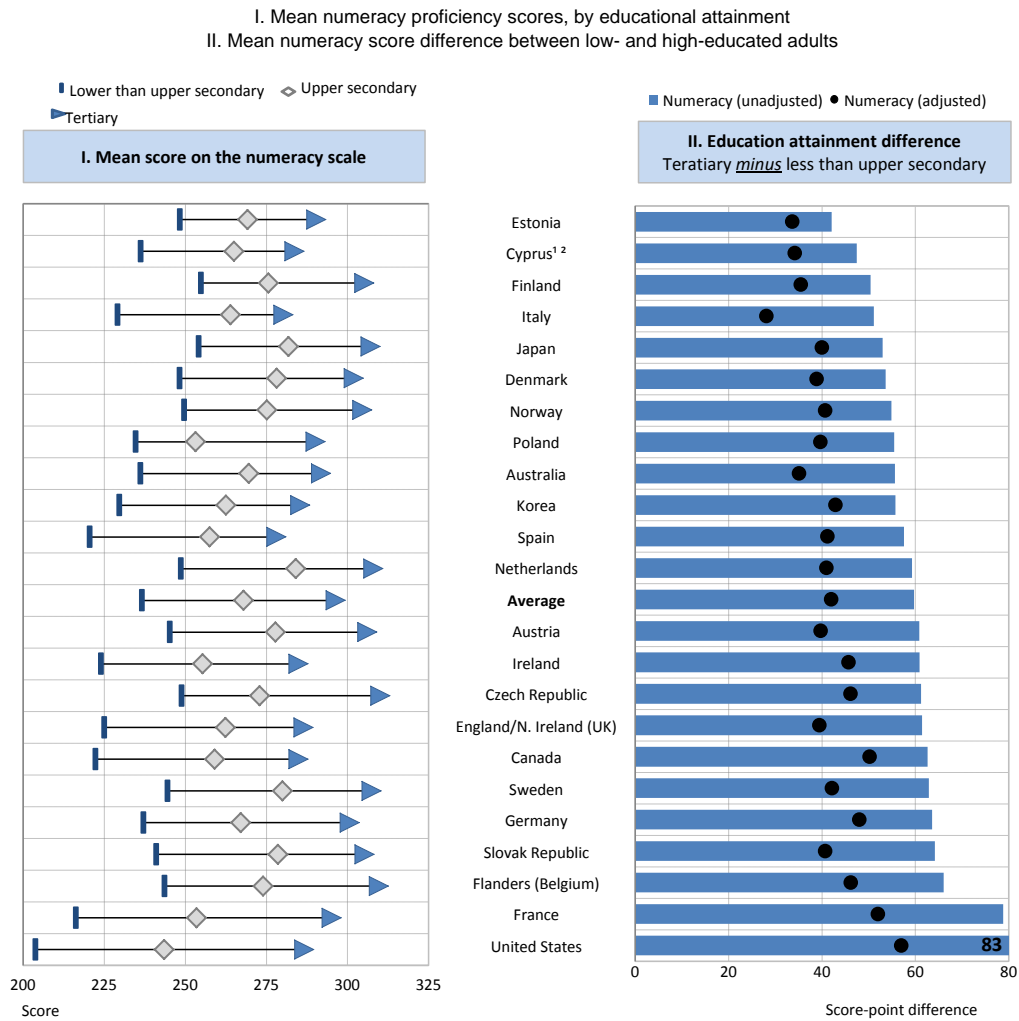
Countries are ranked in ascending order of the unadjusted differences in numeracy scores (tertiary minus lower than upper secondary).

1. Note by Turkey:
The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
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Notes: All differences in panel II are statistically significant. Unadjusted differences are the differences between the two means for each contrast category. Adjusted differences are based on a regression model and take account of differences associated with other factors: age, gender, immigration and language background, socio-economic background, and type of occupation. Only the score-point differences between two contrast categories are shown in panel II, which is useful for showing the relative size across countries of the score-point difference associated with the variable of interest. For more detailed regression results, including for each category of each variable included in the model, see Table B3.17(N) in the webpackage. Lower than upper seconday includes ISCED 1, 2 and 3C short. Upper secondary education includes ISCED 3A, 3B, 3C long and 4. Tertiary includes ISCED 5A, 5B and 6. Where possible, foreign qualifications are included as per their closest correspondance to the respective national education systems.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.1 (N) and Table A3.9 (N).

Problem solving in technology-rich environments

On average across countries, more than half of tertiary-educated adults have good ICT and problem solving-skills in technology-rich environments (Figure 2.4), compared with around 30% of those who have

attained upper secondary or post-secondary non-tertiary education. This varies from highs of 64% in the Netherlands and 62% in Sweden to lows of 36% in Estonia and 38% in Poland. Sweden, the Netherlands and the Czech Republic have the largest proportion of tertiary graduates who score at the highest level.

Figure 2.4: Problem-solving proficiency, by educational attainment

Percentage of low- and high-educated adults scoring at Level 2 or 3 in problem solving in technology-rich environments
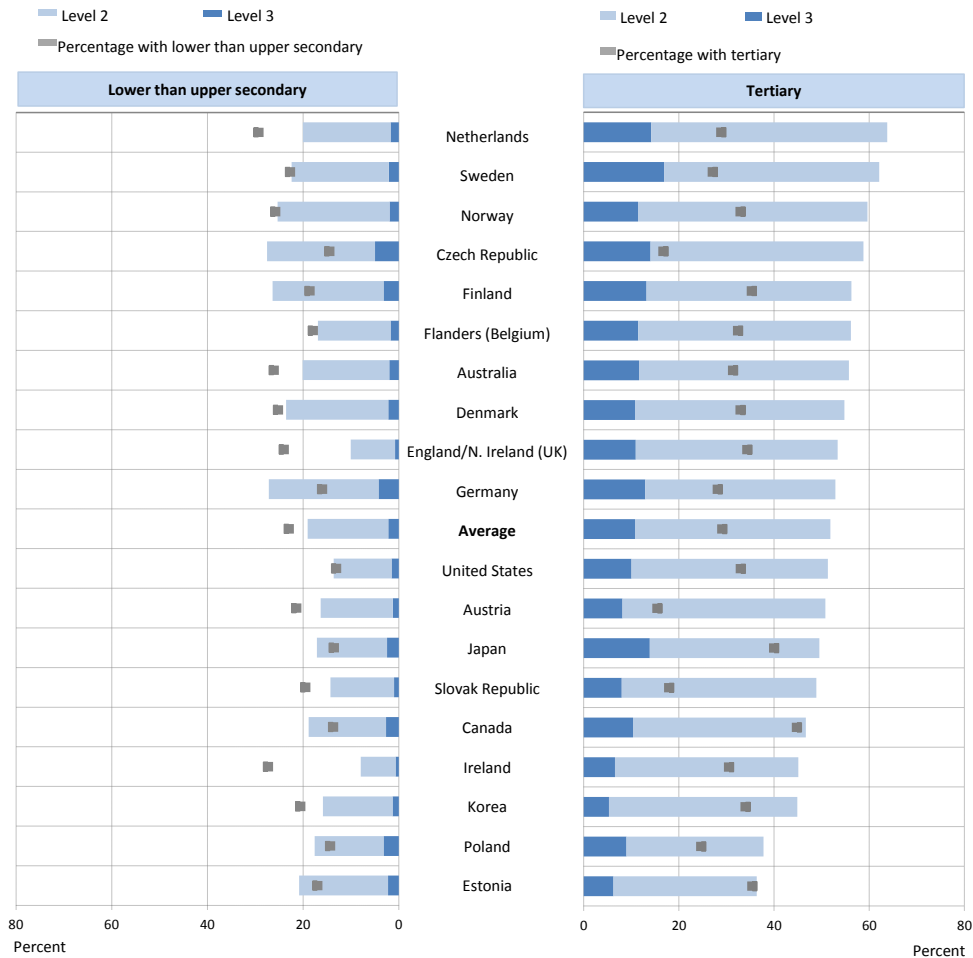
Countries are ranked in descending order of the combined percentage of adults with tertiary attainment scoring at Levels 2 and 3.
Notes: Percentages on the problem solving in technology-rich environments scale are computed so that the sum of proportions for the following mutually exhaustive categories equals 100%: opted out of the computer-based assessment; no computer experience; failed ICT core test; below Level 1, Level 1, Level 2 and Level 3. For more detailed results for each category, see corresponding table mentioned in the source below. Lower than upper seconday includes ISCED 1, 2 and 3C short. Upper secondary education includes ISCED 3A, 3B, 3C long and 4. Tertiary includes ISCED 5A, 5B and 6. Where possible, foreign qualifications are included as per their closest correspondance to the respective national education systems.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.10 (P) and Table B3.6 in Annex B.

Low skills among higher education graduates

Given the extraordinary expansion of higher education, the question emerges whether that has contributed to lowering standards. From the previous section, it is clear that adults with tertiary education are, *on average*, significantly more proficient in literacy, numeracy and problem-solving than other adults. However, as stated before, the longer an adult is out of formal education, the weaker the

direct relationship between their formal education and proficiency, as other factors will play a role in proficiency. Covering only the younger and more recent graduates, those aged 20-34 years old, offers some insights into the effectiveness of tertiary qualifications vis-a-vis the skills measured in the Survey of Adult Skills.

More importantly, it allows us not only to look at the average recent young graduate, but to the whole distribution of skills, and their variability in this age cohort. In particular, it gives insight into the order of magnitude of higher education graduates with low skills. This does not imply that everyone should achieve the same learning outcomes, but that the share of youth who leave education with low skills should be minimised.

Although one might expect that the majority of young adults with higher education qualifications would also perform at the highest levels in basic skills (level 4 and 5 in PIAAC), this is not the case in a number of countries. Around 15% of OECD young university graduates have literacy proficiency at or below level 2, and around 21% have numeracy proficiency at or below level 2 (see Figure 2.5 and Figure 2.6 for the distribution of literacy and numeracy skills among young graduates, respectively).

The spread of performance is particularly large in a group of countries, including the English-speaking countries of Australia, England, Ireland, the US, Canada, plus Italy, Spain and Poland where weak literacy and numeracy among graduates is relatively common.

Figure 2.5: Literacy skills of young university graduates (tertiary-type A only, 20-34 years old)
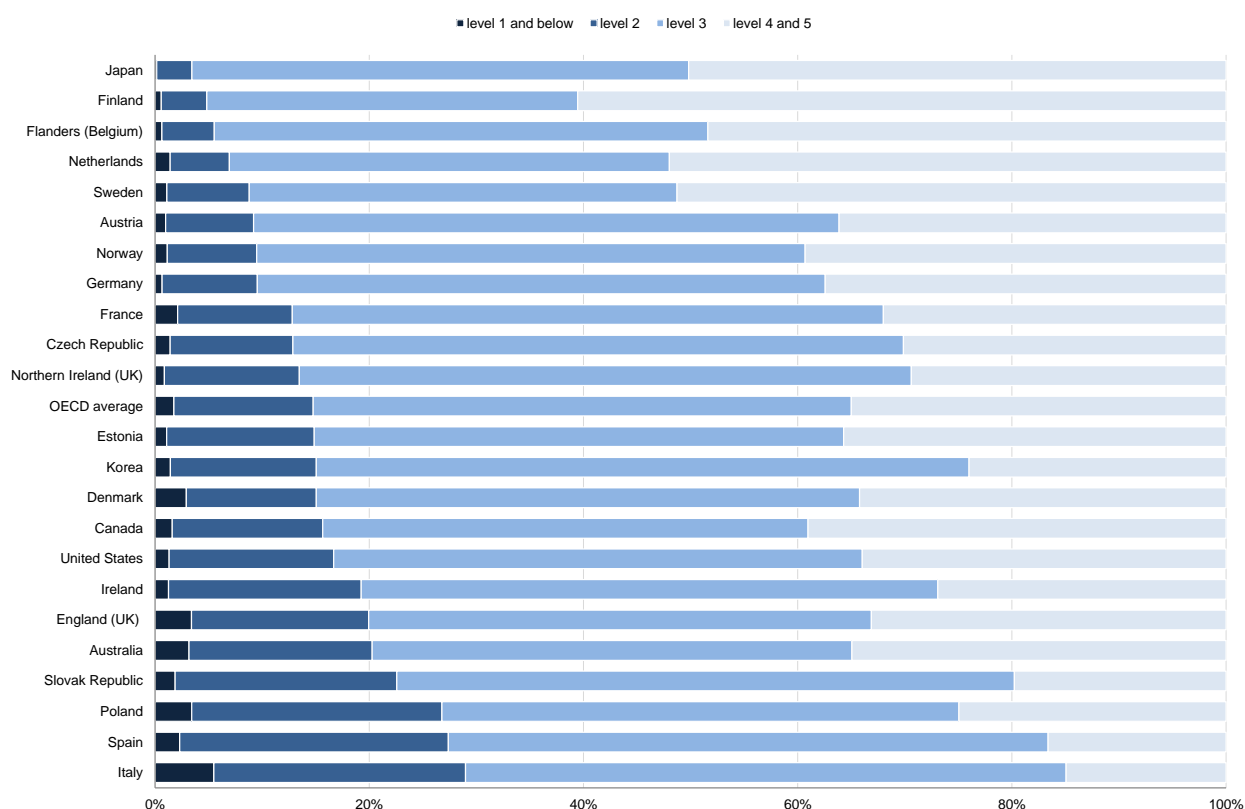
Note: Countries are ranked in ascending order of the percentage of graduates with literacy at or below level 2. In Austria, Czech Republic, Estonia, Finland, Flanders, Germany, Japan, Korea, Northern Ireland, Netherlands, Sweden and the US the estimated percentage of graduates performing at level 1 or below on literacy is not different from zero. Adults who obtained their highest qualification outside the host country: those with foreign qualifications and 1st generation migrants, who obtained their highest qualification prior to entering the host country, are excluded.

Source: OECD calculations based on the Survey of Adult Skills (PIAAC) (2012) (database).

Figure 2.6: Numeracy skills of young university graduates (tertiary-type A only, 20-34 years old)
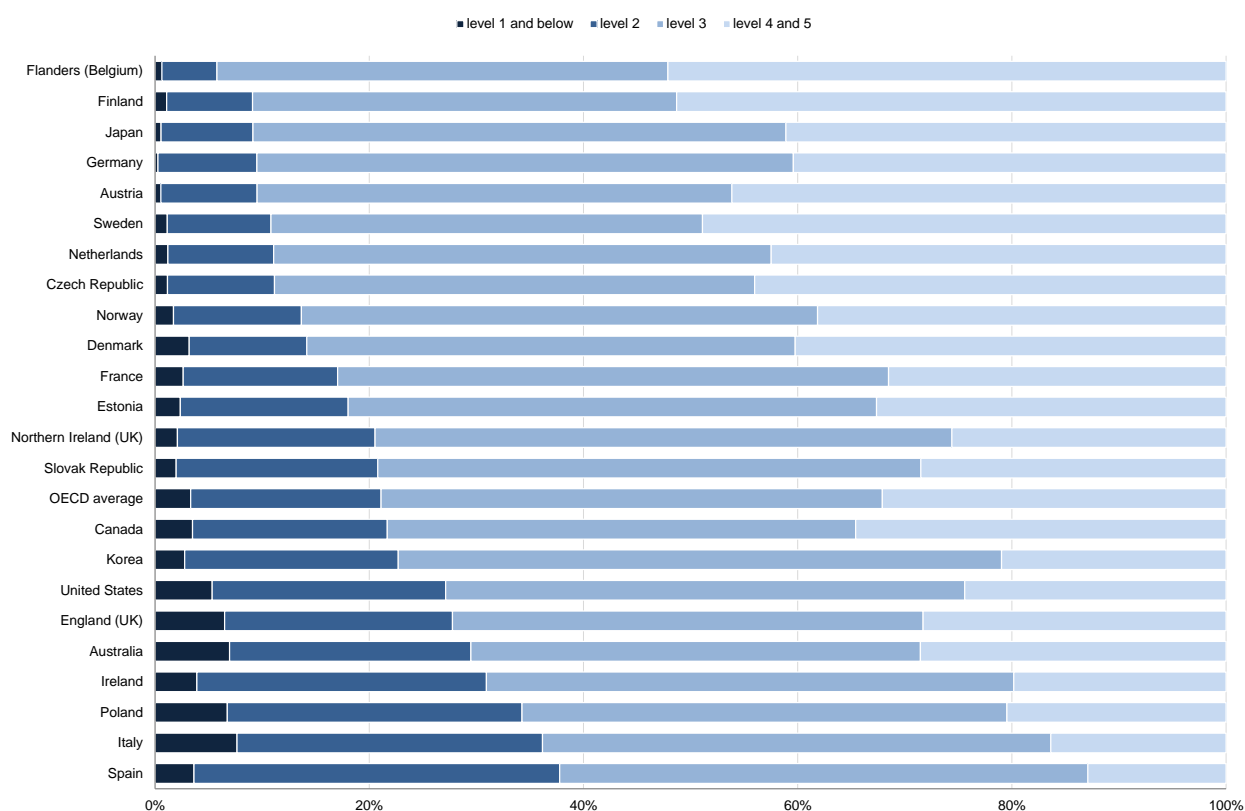
Note: Countries are ranked in ascending order of the percentage of graduates with numeracy at or below level 2. In Austria, Finland, Flanders, Germany, Japan, Northern Ireland, Netherlands and Sweden the estimated percentage of graduates performing at level 1 or below on numeracy is not different from zero. Adults who obtained their highest qualification outside the host country: those with foreign qualifications and 1st generation migrants, who obtained their highest qualification prior to entering the host country, are excluded.

Source: OECD calculations based on the Survey of Adult Skills (PIAAC) (2012) (database).

Are there too many unprepared students entering higher education?

Given the fact that a not negligible percentage of OECD young graduates have literacy and numeracy proficiency at or below level 2, and that the situation is particularly worrying in some countries, the question of whether too many unprepared students are entering higher education emerges.

The expansion of higher education is being driven by students' ambition to go to higher education, as a result of parental and societal aspirations. Higher education, especially university-type higher education, has a very high social status, which exerts a pull not achieved by other non-tertiary post-secondary provision. On the other hand, as discussed, higher education institutions (HEIs) in some countries are becoming increasingly dependent on tuition fees for their financial sustainability. These conditions may allow for some HEIs recruiting students who are not adequately prepared for higher education, either because the school system failed them, or for other reasons. In addition, these institutions may not provide these students with the necessary academic support to make up for their lack of preparation.

The answer to the question of whether too many students are going to university is not clear cut. It is true that some countries with above average higher education attainment also have an above average share of low skilled graduates, such as Poland, England, and Australia (Figure 2.7), for tertiary-type A only). However, some countries reconcile above average higher education attainment with an above

average share of skilled graduates: Finland, Japan, Norway and the Netherlands have similar or higher university attainment rates among young people but they report much lower shares of university graduates with poor basic skills.

Figure 2.7: Are high rates of university attainment linked to low skills among graduates?
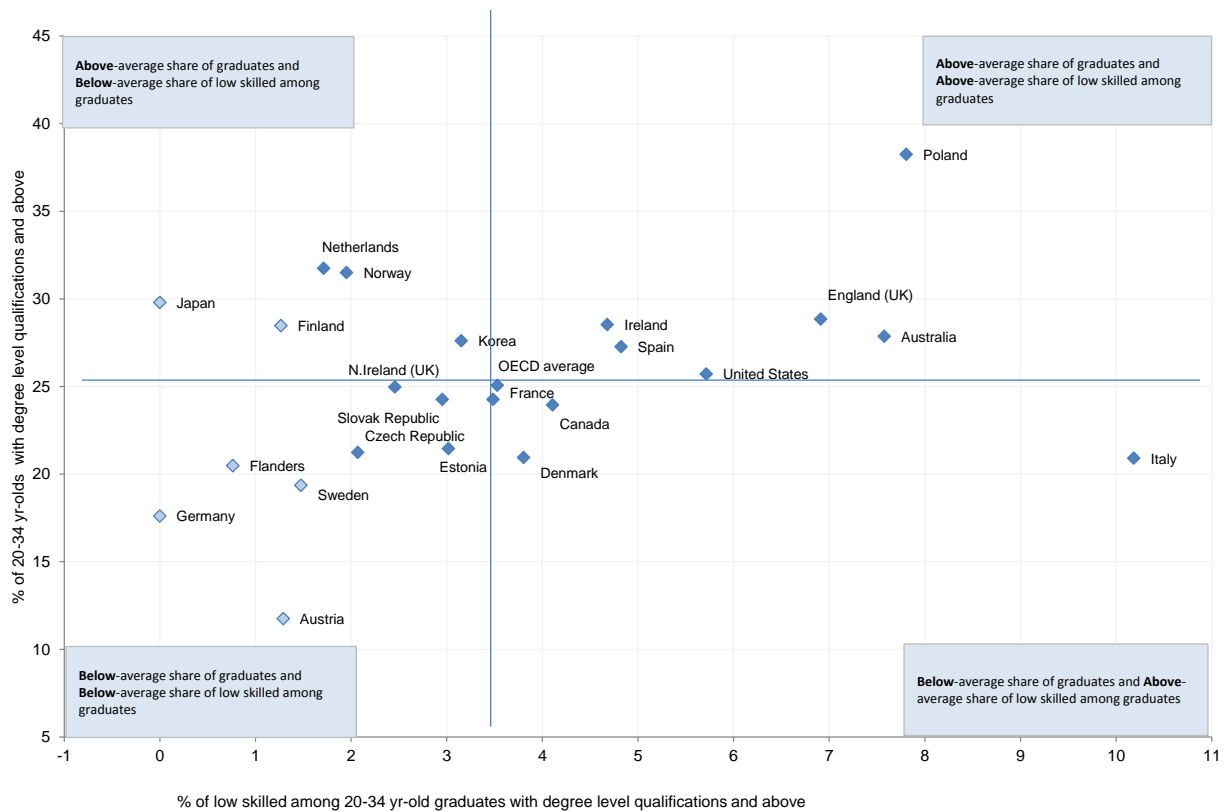
How to read the chart: For example in England nearly 30% of adults aged 20-34 hold a university qualification (vertical axis) and around 7% of these graduates have low basic skills (horizontal axis).

Note: Values not different from zero are shown in a paler shade. In these countries there are very few university graduates with low basic skills. Adults who obtained their highest qualification outside the host country: those with foreign qualifications and 1st generation migrants, who obtained their highest qualification prior to entering the host country, are excluded. Source: OECD calculations based on the Survey of Adult Skills (PIAAC) (2012) (database).

Credentialism and educational inflation

Educational credentials and strong skills are increasingly necessary for fully integrating into and participating in the labour market. Young adults who complete tertiary education generally find a job. However, as shown, individuals with similar levels of education do not always have the same level of cognitive skills which affects their labour market outcomes. In the long run, the desire for credentials, if accompanied by low skill levels, is likely to undermine the value of those credentials in the labour market.

Signalling

As education attainment is easily observable for employers, it acts as a powerful signalling device for youth trying to enter the labour market. This means that investing in educational credentials represents a good investment for the individual. There is evidence that for the same skill level, individuals with higher education qualifications will be paid more than those without. However, if some of those individuals have low level skill proficiency, this is no longer a good investment for society.

The cost to society of university programmes for the low skilled

For higher education graduates with poor basic skills, most of the cost of a university education will probably fall on the taxpayer. Those with poor skills are more likely to be unemployed and those who do find a job will be more likely to earn less than those with better skills. In systems that combine high tuition fees and high student indebtedness, student loan default has become a problem with consequences for public finances if some of these loans are guaranteed by the government (Mangeol, 2014). In other systems, graduates with low skills are less likely to contribute in fiscal terms.

One symptom that HEIs may be admitting students that are not prepared for higher education is the level of non-completion. Around 30% of OECD students who start tertiary education leave without a degree (Figure 2.8). This high level probably reflects failures in the guidance process from compulsory to higher education, lower admission standards, as well as poor programme quality, and the financial cost of education (OECD, 2008). In addition, high non-completion rates can also be a symptom of poor preparation of some students for higher education.

Figure 2.8: Proportion of students who start tertiary education and leave without a degree, 2008
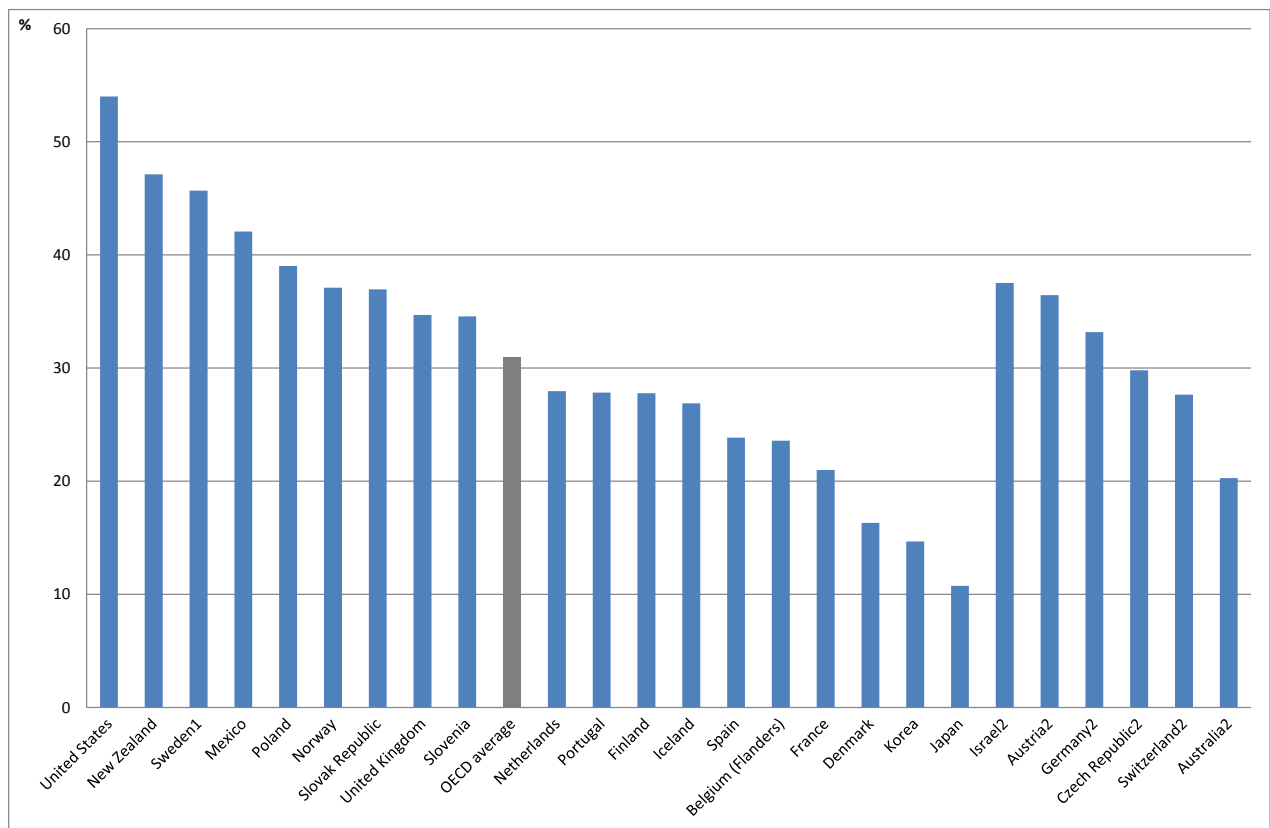
1. Includes students entering single courses who may never intend to study all courses needed for a degree.

2. Tertiary-type A only.

Notes: Countries are ranked in descending order of the proportion of students who leave tertiary education without obtaining a degree. Some of the students who have not graduated may still be enrolled, or may have finished their education at a different institution, as in the United States.

Source: OECD (2010c), Education at a Glance 2010: OECD Indicators, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2010-en.

Dealing with low skills among graduates

Low basic skills among students and graduates give rise to a set of challenges: high non-completion rates, devaluation of credentials in the labour market, poor labour market outcomes, unpaid student debt, less tax contributions. To address these problems the following recommendations are suggested.

Improve upstream non-tertiary education

Tertiary graduates have better labour market outcomes than young adults with less education, but access to tertiary education still largely depends on parents' background (OECD, 2015a: 34), as does performance throughout a student school career. As expected, skill proficiency in young adults is very much correlated with skill proficiency early on; according to data from the PISA and PIAAC surveys (see **Error! Reference source not found.**and **Error! Reference source not found.**, for literacy and numeracy, spectively). This is a very unequitable state of affairs.

HEIs could play a role in improving teacher training, not just initial teacher training programmes, but also through life-long learning programmes for teachers and school leaders. Better qualified teachers would be better able to offer high-quality education, from pre-primary education to post-secondary non-tertiary education, which would help mitigate disparities in education outcomes and to give every student a strong start to their education careers. HEIs can work more closely with upstream education, in order that teachers and school leaders are better able to identify low achievers early on in their school life, to provide them with the support or special programmes they may need to help them attain sufficient proficiency in reading, mathematics and science, and develop their social and emotional skills.

Improving upstream education - early childhood, primary, secondary, and post-secondary education - would not only be beneficial in itself, it would also assure a good supply of students to higher education, and would thus improve equity all the way through the education supply chain.

Figure 2.9: Mean literacy proficiency in PISA and in the Survey of Adult Skills
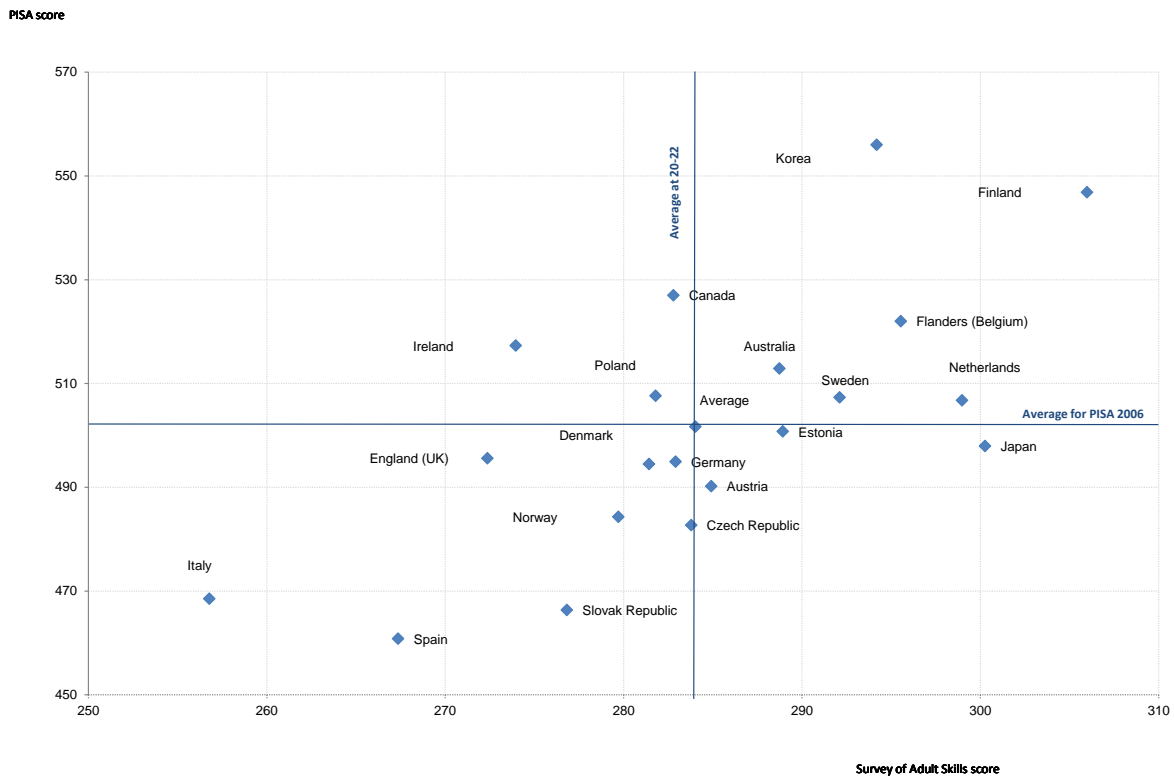
Figure 2.10: Mean numeracy proficiency in PISA and in the Survey of Adult Skills

PISA score

[A scatter plot comparing PISA score (y-axis, 450 to 570) against Survey of Adult Skills score (x-axis, 240 to 320). Data points plotted: Korea, Finland, Flanders(Belgium), Netherlands, Canada, Japan, Australia, Estonia, Denmark, Czech Republic, Average, Austria, Germany, Sweden, Ireland, Poland, England (UK), Slovak Republic, Norway, Spain, United States, Italy. Vertical line labelled "Average at 20-22" and horizontal line labelled "Average for PISA 2006".]

Survey of Adult Skills score

How to read: These charts show how 15 year-old students performed in PISA (Programme for International Student Assessment) relative to other countries, and how the same cohorts scored, again relative to other countries, as young adults a few years later in the Survey of Adult Skills. The charts show a comparison of 15 year-olds in the 2006 PISA assessment with that of 20-22 year-olds in 2012 in the PIAAC assessment.

Note: The average presented here is a refinement of the average presented in the main report of the Survey of Adult Skills (OECD, 2013). It refers to the arithmetic mean of country estimates, restricted to the set of countries that participated in both the Survey of Adult Skills and the corresponding round of PISA. Migrants, who entered the host country in 2006 or later, were excluded from the PIAAC sample.

Source: OECD, Survey of Adults Skills (2012) and OECD, PISA database (2006).

Attract additional resources for teaching

Higher education has never been in greater demand. However, higher education is also costly, especially when its costs are greatly expanded by massification. Governments are confronted with other pressing public needs, as governmental tax capacities are limited. The result can be a decrease in public funding, if not in overall terms, often in per student funding, as enrolment increases faster than total expenditure. This may mean that the resources available for teaching and learning are scarcer, especially those necessary to address the low skill level of some students.

Higher education, given its nature, has a greater capability of complementing its public revenue with private revenue and resources. HEIs can try and engage a broad range of non-governmental actors, including employers, professional and industry associations and chambers of commerce, and trade unions to share the task and attract other resources for educating their students. In addition they can develop processes to attract additional income from individual or organisational donors, such as alumni, foundations, and philanthropists, in order to improve the quality of the university and of the educational experience of students.

Some of these extra resources could be dedicated to programmes designed to compensate for unequal educational opportunities at the secondary level, and overcome the skill weaknesses of some students.

Ensure that entrants to higher education have the required skill proficiency

It is important that access policies to higher education, while emphasising widening access, and thus the equity agenda, ensure that only those able to benefit participate in higher education. As argued previously, the equity agenda is better served by improving upstream education rather than widening access to students who do not possess the required skills for higher education.

Higher education participation typically rests on the assumption that entrants to university are well-prepared with core information-processing skills acquired at school. Figure 2.11 shows that some countries are graduating more young people from university than what would be expected, given the academic skills of those in the potential entrant pool (aged 16-19). This suggests an imbalance between an entrant pool with weak skills and a high level of university participation in countries such as the United States, Spain, Ireland, England, and Poland.

Figure 2.11: Attainment of university education in relation to the skill levels of potential applicants
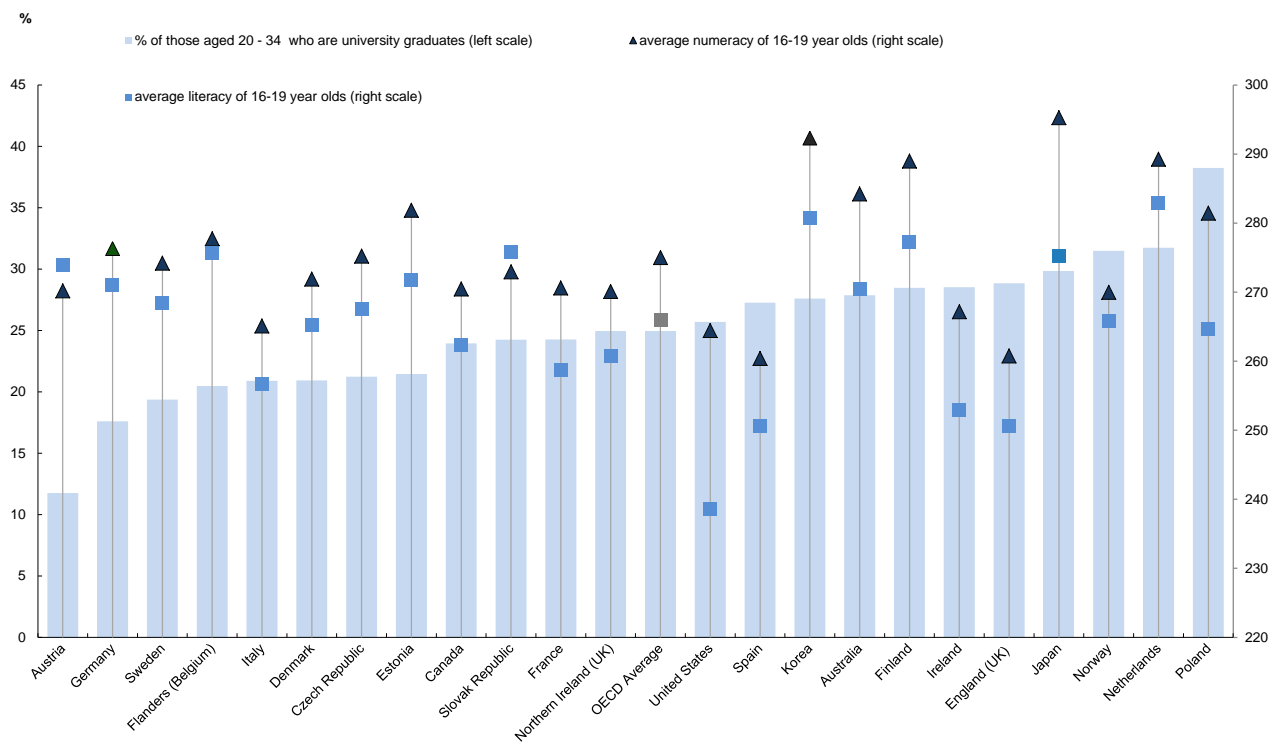
Note: Adults who obtained their highest qualification outside the host country: those with foreign qualifications and 1st generation migrants, who obtained their highest qualification prior to entering the host country, are excluded.

Source: OECD calculations based on the Survey of Adult Skills (PIAAC) (2012) (database).

Provide good quality alternative professional education

In the OECD skill study of England, a country with a significant share of graduates with low skills, it has been argued that most low-skilled students pursuing university programmes should be diverted into programmes better suited to their needs (Kuczera et al, 2016). Namely it is recommended that short

professional postsecondary programmes are further developed, as they might better meet the needs of those involved.

Those who complete professional education and training programmes may eventually wish to transition to tertiary education. As such, it is important to build articulation frameworks to support that transition, and to underpin those frameworks with measures to ensure transparency and quality in the learning outcomes from professional education and training (OECD, 2014).

Develop student academic support

The skill distribution of university students is quite wide in the majority of OECD countries (see Figure 2.12 and Figure 2.13 for literacy and numeracy, respectively). Even if those with low skills are excluded from participating in higher education, that still leaves a considerable number of students with a wide range of intermediate skill proficiency participating in higher education.

In the transition from an elite to a mass system of higher education, in the context of widening access policies, it is important to assure the capacity of the sector to tackle intermediate basic skills and offer good quality student academic support. This may mean reforms in both curriculum and pedagogy, including remediation initiatives, to make sure those students who still have some numeracy and literacy weaknesses, fully benefit from higher education and become competent graduates, valued by the labour market.

Figure 2.12: Distribution of literacy skills among current university students 16-34 year-olds
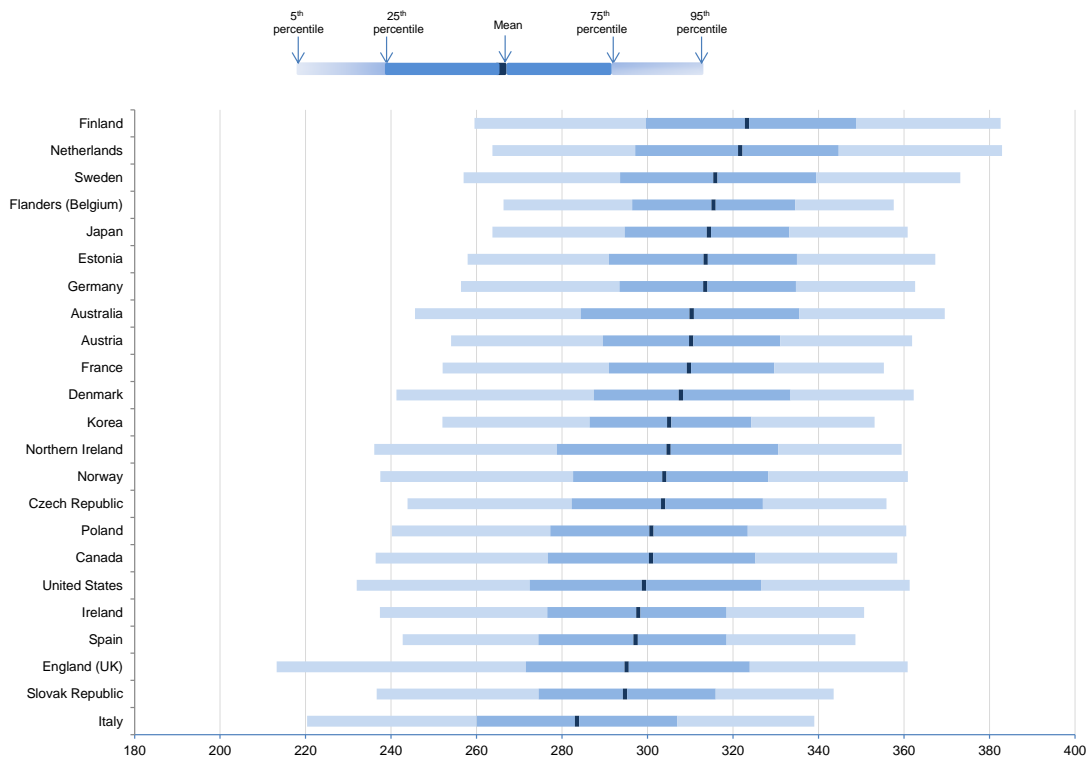
Note: Countries are ranked in ascending order of the mean.

Source: OECD calculations based on the Survey of Adult Skills (PIAAC) (2012) (database).

Figure 2.13: Distribution of numeracy skills among current university students 16-34 year-olds
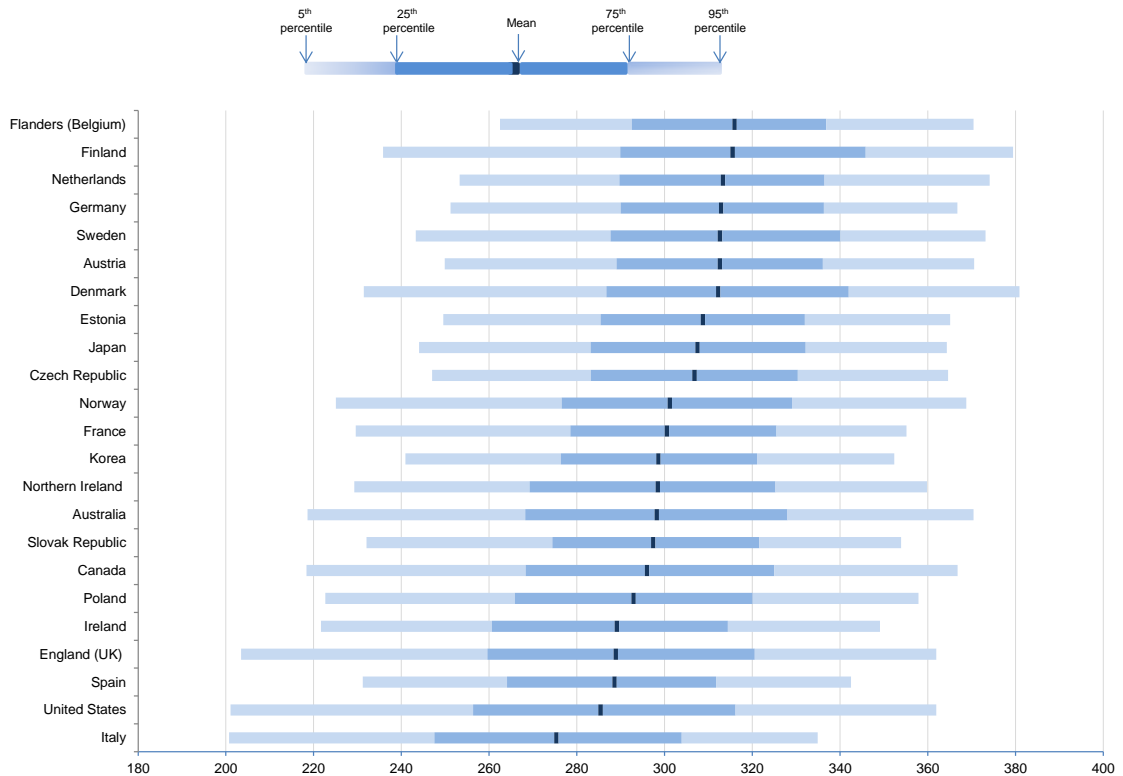
Note: Countries are ranked in ascending order of the mean.

Source: OECD calculations based on the Survey of Adult Skills (PIAAC) (2012) (database).

Promote staff development and the quality of teaching and learning

Providing good quality student academic support may entail staff development in teaching and learning. Broadening access to a wider range of students in today's mass higher education systems means that some students may enter higher education without the strong critical thinking, analytical and communication skills that many academic staff expect their students to have. Many academics do not have the professional teaching and learning skills needed to provide those students with greater academic support. More attention needs to be given to providing professional development for academic staff in this respect (Tinto, 2005).

In other education sectors the quality of teachers is recognised as a crucial factor in the success of students, but teaching and learning in higher education often is not a priority and research performance is usually rewarded more than teaching performance (Locke and Bennion, 2010). A recent survey of the academic profession in Europe showed that academic staff tend to devote more time to research than to teaching (Höhle and Teichler, 2013). Among the university staff surveyed, almost three-quarters reported that they lean towards research or have a preference for research. Surprisingly, this is also the case for non-university HEIs where the teaching function plays a considerably stronger role. More than 40% of academics at non-university HEIs reported that they also have a clear preference for or lean towards research.

Moreover, less than a quarter of the academics at universities believe that recruitment and promotion decisions are strongly based on the presumed teaching quality of academic staff. In addition, there is no

overwhelming enthusiasm about teaching support on the part of administrative staff in the surveyed countries.

The attitudes towards teaching and learning in higher education are similar in other regions. A survey of Canadian university professors, for instance, indicated that 15% of academics were primarily interested in research and 54% were interested in both research and teaching, but "leaning towards research" (Jones et al, 2014).

This state of affairs is not conducive to overcoming the problems posed by students with weaknesses in their skill levels. More needs to be done in higher education to promote staff development and the quality of teaching and learning.

Be prepared for life-long learning provision

Participation in adult education and training is now common in many countries, but the Survey of Adult Skills indicates major differences across countries. Participation rates in adult education exceed 60% in Denmark, Finland, the Netherlands, Norway and Sweden, while in Italy they remain well below half that rate. Countries showing higher levels of participation in organised adult learning activities also demonstrate higher literacy and numeracy skills. The large variation among countries at similar levels of economic development suggests major differences in learning cultures, learning opportunities at work, and adult-education structures.

Countries with rapidly ageing populations, and shrinking youth cohorts, will become even more dependent on developing the skills of older adults (Samuelson and Bogers, 2016). In this context, HEIs ought to cater more to mature students who will benefit from higher education, rather than widening access to younger students with too low skills to be able to get value from it. However, the needs of mature students will necessarily be different to the traditional 18-year olds, straight from school, and universities need to develop the capability to cater for those students.

Promote internationalisation

In some countries, the pool of potential applicants to higher education is shrinking due to demographics (for more on this, see Samuelson and Bogers (2016), in this volume). In an attempt to keep established capacity, institutions often lower entry requirements in an attempt to keep their institutions running. An alternative to this strategy is to consider internationalising the higher education system in order to attract talent from abroad, maintaining entry standards, and possibly even expanding student numbers to maintain the existing higher education infrastructure. An additional alternative is, as mentioned in the previous section, to enlarge provision to mature students with the skills to benefit from higher education.

Monitor the skill level of students and graduates

The problem of low skills among students and graduates has been made patent by the Survey of Adult Skills. However, this is a general survey for the whole of the adult population and takes place only every 10 years. Institutions could develop and use instruments to monitor the level of their student and graduate skills more systematically, and act accordingly.

The Higher Education Quality Council of Ontario (HEQCO) is conducting a pilot project to assess learning outcomes in higher education using the OECD's **Education and Skills Online** assessment tool. Participating colleges and universities will test incoming students on their literacy, numeracy and problem-solving skills, and give the same test to the graduates as they leave (Brown, 2016). HEQCO is also exploring other ways of measuring learning outcomes through its **Learning Outcomes Assessment Consortium** (a consortium of six postsecondary institutions created in December 2012). Participating institutions are developing and piloting various assessment tools and techniques that could be scalable to the institution level in the future (HEQCO) (Goff et al., 2015).

Other countries have developed or used a range of instruments in relation to the assessment of learning outcomes in higher education. The Australian Learning and Teaching Council (ALTC) funded the **Assessing and Assuring Graduate Learning Outcomes** (AAGLO) project to gather evidence about the type of assessment tasks and assurance processes that provide convincing evidence of student achievement of and progress towards graduate learning outcomes. AAGLO was one of a number of projects and initiatives that reflect increasing international attention to the quality of student learning outcomes (Barrie et al., 2011). The UK Quality Assurance Agency (QAA) developed statements of expected learning outcomes called **Subject Benchmark Statements** for different disciplines. The Higher Education Funding Council for England (HEFCE) is currently funding pilot projects to develop measures of **learning gain** in higher education. In the context of the Bologna Process, the **Tuning Project** developed threshold-level learning outcomes and competences for disciples such as history, chemistry, nursing and business. A subsequent activity was the development of the **Dublin Descriptors**, which are broad statements of learning outcomes that distinguish among bachelor, master, and doctoral level awards in five areas of learning. Other **Tuning** initiatives were developed for Latin America and the USA. The USA has also expanded the use of standardised instruments such as the Collegiate Learning Assessment (CLA) to assess graduate achievement, the **CLA +**. Similar developments are taking place in Europe with the recent Measuring and Comparing Achievements of Learning Outcomes in Higher Education in Europe (**CALOHEE)** project, which builds on the Tuning Project and is looking at the feasibility of measuring and comparing achievements of learning outcomes in higher education in Europe.

With the introduction of ISCED 2011, which distinguishes between short-cycle bachelor's, master's, and doctoral tertiary education, and between academic and professional orientations, this monitoring can be done and compared across different types of tertiary education provision. This is important so that unwarranted credentialism and educational inflation does not spread through all levels of higher education.

Conclusion

Based on current patterns of graduation, an average of 50% of today's young people across OECD countries is expected to graduate from higher education at least once during their lifetime. The attraction of higher education is explained by the fact that it clearly pays, both in the labour market and in life. Adults with higher education qualifications have the best outcomes in the labour market: they are less likely to be unemployed, and, on average, they earn more than adults with upper secondary education who, in turn, earn more than adults with below upper secondary education. In addition, continuing higher education after a bachelor's degree also pays off on average.

The benefits of education are not only financial; more highly educated adults tend to be more engaged in the world around them. Adults with higher education are more likely to report desirable social outcomes, including good or excellent health, participation in volunteer activities, interpersonal trust, and political efficacy.

Although countries differ dramatically in the way the cost of higher education is shared among public and private sources, and in the financial support they provide to students, state funding exceeds private funding in the vast majority of OECD countries. Public funding of higher education is justified by the fact that higher education not only pays off for individuals, but also for the public, in greater tax revenues and social contributions from a larger proportion of tertiary-educated adults.

However, as higher education continues to expand, doubts are starting to be raised about the learning outcomes of graduates, and the returns on investment from the participation of increasing number of students. These concerns point to the need of good assessment of higher education learning outcomes. More needs to be done to have good measures of these outcomes to inform policy (Schleicher, 2015). Nonetheless, PIAAC data evidences that some students do not have the information-processing skills

required for higher education, and that in fact, some higher education graduates possess very low skills indeed.

PIAAC data shows that this is a problem for a number of countries, but by no means all countries. Some countries might even benefit from higher participation rates, given the potential pool of candidates with the requisite skills.

The chapter offered some preliminary ideas to deal with low skills among higher education graduates, but clearly more work needs to be done in terms of evidence to diagnose problems and solutions to address those problems.

This type of work will be further developed within the newly launched OECD programme of work in higher education policy analysis, *Enhancing Higher Education System Performance*, which will collect data and information across different performance dimensions in higher education to:

- compare performance across higher education systems to identify which higher education systems are performing well, in which areas, and why; and

- identify strengths and weaknesses within national higher education systems.

The new classification of education levels ISCED 2011 will be used. Compared to ISCED 1997 that only recognised two levels of higher education, it discriminates better between different levels: short-cycle tertiary education, bachelor's, master's, doctoral. This will also allow for a more rigorous analysis of different types of higher education, and the differences between them.

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CHAPTER 3 - AN INTRODUCTION TO OECD INTERNATIONAL TERTIARY EDUCATION INDICATORS

Gabriele Marconi

Introduction

The scope and number of international education indicators have been increasing uninterrupted since the 1970s, while at the same time the variety of policy interests that they serve has similarly increased. The set of indicators has expanded together with the number of data sources and methodologies employed to calculate them, aided by the continuous improvement in the underlying classifications of education systems internationally. The flagship OECD publication, *Education at a Glance*, for instance, started with 151 pages in its first edition in 1992; grew to 384 pages in its tenth anniversary edition in 2002; and reached 564 pages in its latest edition in 2015. It takes more than 'a glance' nowadays to get a comprehensive picture of education systems worldwide. It is therefore understandable that many users find it increasingly difficult to orient themselves in the expanding collections of international education statistics.

This chapter presents an overview of OECD international education statistics, including an introduction to their history (Section 2) and the way they are collected (Section 3). It also describes two possible sources of confusion for users who are unaccustomed to the complexity of the OECD education database: differences in the definitions or in the data sources used to calculate similar indicators. These differences are exemplified by the indicator on mobility in higher education and by the calculation of employment rates (Section 4).

The focus of the chapter is on tertiary education. However, as it is difficult to see developments in tertiary education statistics in isolation from the developments occurring for other levels of education, it is often necessary to widen the perspective.

It should be noted that the term 'tertiary education' refers to the levels of education following secondary education and includes what is commonly understood as academic education as well as advanced vocational or professional education (UNESCO-UIS, 2012). It is therefore interchangeable with the term 'higher education' for the purposes of this discussion.

A short history

Education was one of eleven fields of statistics identified for discussion at the first International Statistical Congress held in Brussels in 1853, showing just since how long statisticians have been interested in the possibility of compiling international education statistics (Smyth, 2008). Governments have also shown an interest in this matter for a very long time – governmental authorities from Ecuador, Poland and the Canton of Geneva, together with the private foundation J.J. Rousseau, founded the International Bureau for Education (IBE, incorporated in UNESCO in 1968) in 1929 (Rossello, 1970).

The 1937 edition of the International Yearbook published by the IBE presented readers with some of the earliest examples of international education statistics tables. However, these early tables of international education statistics presented enormous problems in terms of comparability. Only readers who were very familiar with the education systems of different countries could meaningfully interpret the data (Smyth, 2008). This problem was evident to contemporary statisticians and statistics users. Comparative educationist Nicholas Hans wrote in 1933: "In comparing educational systems the first difficulty is that of classification and terminology. […] The German and the Dutch 'lyceum', for instance, do not mean the same thing at all. The problem can be solved only by using an artificial terminology which can be applied uniformly to all countries" (Hans, 1933, quoted in Smyth, 2008, pp. 5-6). This fundamental problem still lies at the heart of international collaboration in education statistics.

The ISCED classification

As noted above, Nicholas Hans stated as early as the first half of the last century that the structure of education systems varies widely between countries. A framework to collect and report data on education programmes with a similar level of education content is therefore necessary to produce internationally comparable education statistics and indicators. UNESCO's International Standard Classification of Education (ISCED) is the reference classification for organising education programmes and related qualifications by education levels and fields. The basic concepts and definitions of ISCED are intended to be internationally valid and comprehensive of the full range of education systems (OECD, 2015).

The ISCED classifications are a product of UNESCO, which was established in 1946 to promote international cooperation in education, science and culture. Soon afterwards the Universal Declaration of Human Rights was adopted, declaring among other goals that "elementary education shall be compulsory", and that "higher education shall be equally accessible to all on the basis on merit". UNESCO soon intensified the work on comparability of international statistics, to be able to produce metrics related to these goals (Smyth, 2008). This work, based on multilateral cooperation and coordination, and on discussion between national statistical experts from UNESCO member countries, led to the "Recommendation concerning the international standardisation of educational statistics" in 1958, and finally to the release of the first ISCED classification in 1976 and its update in 1997.

The changes in education and learning systems throughout the start of the 21st century led to a further review of ISCED between 2009 and 2011. This involved extensive consultations with countries, regional and statistical experts, and international organisations. The revised ISCED 2011 classification was adopted by the UNESCO General Conference at its 36th session in November 2011.

The revision took into account, among other things, the distinction between the classification of education programmes and of attainment levels. One example of the relevance of this distinction is when two or more sequential programmes constitute one ISCED level, as in the case of New Zealand's National Certificate of Educational Achievement levels 1-3, which make up the typical general pathway within upper secondary education in that country (UNESCO-UIS, OECD and Eurostat, 2013). In such cases, enrolment in the lower programmes in the sequence counts as enrolment at the ISCED level of the final programme, but "for educational attainment, only recognised successful completion of the final programme in the sequence counts as level completion" (UNESCO-UIS, pp. 9-10).

In addition, the important shifts in the structure of higher education occurring throughout the world (notably through the Bologna process in Europe) have also been taken into account (OECD, 2015). Tertiary education has been restructured in ISCED 2011 and now comprises four levels of education compared with two levels in ISCED 1997. This reflects the developments in many tertiary education systems around the world, by introducing a distinction between short-cycle tertiary programmes (ISCED level 5), bachelor's or equivalent programmes (ISCED 6), master's or equivalent programmes (ISCED 7), and doctoral or equivalent programmes (ISCED 8).

This update of the classification provides interesting possibilities for the analysis of higher education systems, some of which have been presented in *Education at a Glace 2015* (OECD 2015). But it also means that, in some cases, caution is needed in the comparison between indicators referring to similar levels of education according to the ISCED 1997 and ISCED 2011 classification. For example, enrolment rates in programmes classified at the second stage of tertiary education in ISCED 1997 are usually similar, but not necessarily identical to enrolment rates in programmes classified at the doctoral or equivalent level in ISCED 2011.

Education statistics in the OECD

The landscape of education statistics was transformed by the intense work conducted in this field by the Organisation for European Economic Co-operation (OEEC) and its successor, the Organisation for Economic Co-operation and Development (OECD). The OEEC had originated in 1948 to help the post-war reconstruction and economic development of Europe by coordinating the utilisation of the resources that

the US made available through the Marshall plan. Reflecting this focus, the OECD made no explicit reference to education in its founding conventions.

However, education soon entered the scope of its activities because of the contribution it can make to economic growth. Research in education started in the Directorate for Scientific Affairs and became an important concern after the "Sputnik shock" when the US and Western European countries realised that they were lagging behind their Russian counterparts in terms of technological capacity. Countries related this situation to the presumed inability of their education systems to supply the economy with a sufficient number of adequately prepared scientific and technical personnel.

In the late fifties, the OECD sent member countries the first of a series of surveys to get a picture of likely trends in the supply and demand of scientists, engineers and technicians. Hence, since its early days, the OECD has been interested in tertiary education. These surveys drove intensified international cooperation in the field of education statistics to lay down common definitions and conceptual schemes among the member countries. The results of these surveys on the supply and demand of scientists, engineers and technicians showed that 32% of the relevant age group were entering higher education in the US and Canada in 1959, against a mere 5% in the European member countries. These results further convinced the European member countries of the need for further work in this area (Papadoupulos, 1994).

In 1974, the first Educational Statistics Yearbook was published by the OECD, and work on education statistics further intensified after the adoption of the ISCED classification in 1976. The OECD Indicators of Education Systems (INES) project was launched after a series of conferences between 1987 and 1991 (OECD, 1992) to improve the availability and comparability of international education statistics, and its flagship publication *Education at a Glance* first appeared in 1992. The current publication of *Education at a Glance* contains more than 100 charts, 200 tables, and 90,000 figures. It provides a rich and internationally comparable set of indicators on the output of education institutions and the impact of learning on economic and social outcomes; the financial and human resources invested in education; access to education, participation and progression; the learning environment and the organisation of schools (OECD, 2012).

Since the INES project was launched, interest in tertiary education has continued to increase alongside growth in the sector. Figure 3.1: shows that the number of students enrolled in tertiary education more than doubled between 1986 and 2012 in the OECD countries with available data over that period. Enrolments increased by more than 70% in the United States, a country which already had a relatively high enrolment rate to start with, and by a staggering 256% in Sweden. In Turkey, the number of enrolled students was almost ten times larger in 2012 than it was in 1986. This dramatic increase in the number of students raised the policy interest in topics such as the massification of tertiary education, the related problems of cost and quality control, and the performance of tertiary graduates on the labour market.

Figure 3.1: Development of student enrolment in tertiary education in selected OECD countries, 1985-2012
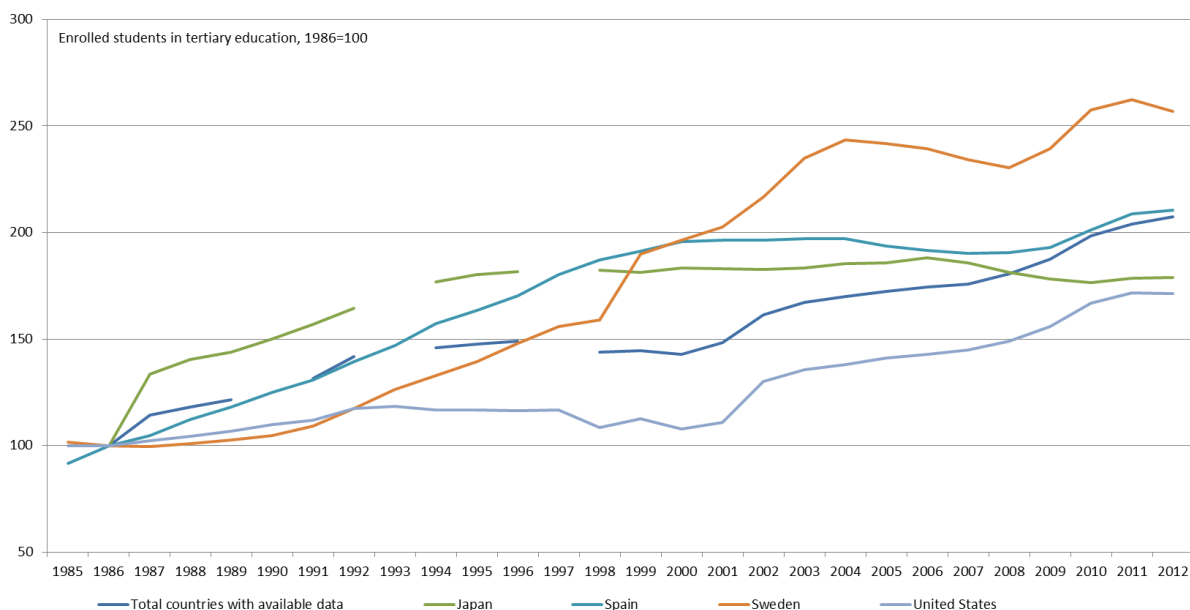
Source: OECD Education database, retrieved from stats.oecd.org on March 1, 2016.

Notes: The countries with available data for the period 1986-2012 are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. Year for which more than two data points (1985, 1990, 1993 and 1997) were missing have been excluded from the calculation. Some remaining missing data (about 1% of cases) have been interpolated as the average between the previous and successive year with available data.

Other important developments were happening in the field of statistics related to student learning in the second half of the twentieth century. In the 1960s, the education policy discourse at the OECD was centred upon system-level planning, and driven by the need to expand the capacity of the education system to meet the demand for skilled workers coming from the economic system. Starting from the seventies, the discussion moved towards the themes of efficient use of resources in the education system, equity of its outcomes, and the different goals and stakeholders of the education system. In the eighties, the debate shifted decisively towards the "quality" of education, with its multiplicity of meanings (Papadoupulos, 1994).

This shift in the policy discourse paralleled important developments in the assessment of student competences. The methodology for student assessment had been developing in the US since the beginning of the twentieth century, partly thanks to the work of Educational Testing Service (ETS). Since the mid-1960s, the International Association for the Evaluation of Educational Achievement (IEA) started to carry out assessments of international student competences and it was later followed by other institutions (see Hanushek and Kimko, 2000, for an overview of these surveys and an interesting application of the related data).

Building on this progress, the OECD launched the first wave of its Programme for International Student Assessment (PISA) in 2000. The PISA survey is designed to test the skills and knowledge of 15-year-olds at school. This survey, which was administered to about 510,000 students in 65 countries in 2012, paved the way for a number of other OECD international surveys in the fields of education and skills.

Nowadays there are, broadly speaking, two ways through which the OECD collects international education statistics: one is to ask national ministries or statistical agencies for these statistics, which then go through a process of validation before being published; the second one is to design and administer a survey to individuals or institutions in different countries, and then process the data. The UNESCO-OECD-Eurostat (UOE) data collection and the Programme for International Student Assessment (PISA) are outstanding examples of the first and second of these approaches, respectively.

By working with different data collection methods, the OECD has created a very large database on education statistics. As a result, policy makers can now base their discussions on how to reform education systems on much more solid international evidence than in the past.

Data collection procedures used by the OECD

The UNESCO-OECD-Eurostat (UOE) data collection

Shortly after the adoption of the ISCED classification by UNESCO in 1976, the OECD discontinued the classification system it had previously developed in favour of ISCED to avoid the duplication of work. The organisation began negotiations with UNESCO and the Statistical Office of the European Communities (Eurostat) to produce unified questionnaires that the three organisations could send to their common member countries to collect data. In this way, the burden of statistical reporting is reduced for member countries of all organisations. As a result, from the 1980s, the joint UNESCO-OECD-Eurostat (UOE) data collection has yielded comparable international statistics on a number of education issues (including enrolments and education finance).

The UOE data collection is an important example of international cooperation in education statistics. UNESCO, the OECD and Eurostat go through a rigorous process of negotiation and agreement on the most relevant statistical questions to ask their common member countries. Before being included in a questionnaire, the questions are refined through extensive discussion among the delegates designated by the member countries of these organisations. The delegates evaluate whether the questions are relevant for the purpose of policy analysis in their countries, whether the required collection procedures and definitions are sound enough from a methodological point of view, and whether comparable data exist in a sufficient number of countries to make the international comparison of the results meaningful.

The result of this process is a set of questionnaires that is sent to officials of the member countries (usually, civil servants working in the ministries dealing with education or in the offices for national statistics) by UNESCO, OECD and Eurostat. In these questionnaires, the member countries are asked to report a set of statistics, e.g. the number of national and international students enrolled in tertiary education; the total current and capital expenditure in primary, secondary and tertiary education; and so on. UNESCO, the OECD and Eurostat cooperate to examine and validate the statistics provided by the countries via the questionnaires.

Once the filled-in questionnaires are validated, the OECD puts forward a proposal to the member countries on how the data will be displayed and analysed (UNESCO and Eurostat do the same for their member countries). Each country at this stage is encouraged to provide feedback to the OECD secretariat and identify any problem that could arise when comparing its education system data with data from other countries. After taking this feedback into account, the data are finalised and published in various OECD publications.

It is important to stress that the data gathered through the UOE process are supplied by the member countries. The national ministries or statistics offices collect the data at the level of the individuals or institutions (micro-data) from surveys or administrative sources, process these data and send the aggregate numbers to the international organisations involved in the data collection. Comparability issues are smoothed out through the international coordination process but remain a quintessential characteristic of the data. The international organisations publishing the data take great care in supplying the readers with all the information concerning the definitions, the caveats and the exceptions that are necessary to interpret the data correctly.

International survey data

The alternative to gathering data from ministries or national statistics offices is surveying individuals or institutions directly in different countries. The OECD has instigated a number of very important surveys in the field of education statistics. As noted above, its first international survey, PISA, was launched in 2000.

Two other surveys that have been very influential in their policy fields, the Teaching and Learning International Survey (TALIS) and the Survey of Adult Skills (PIAAC), followed in 2008.

In the case of an international survey of individuals or institutions, it is the international organisation responsible for the survey that collects the micro-data and processes them. The decisions on the relevant questions that should be asked to the individuals and the sampling, translation and administration procedures (or on their outsourcing) are made by the international organisation and the member countries through international coordination. The questionnaire is then filled in by the respondents and the international organisation is responsible for processing and analysing the data. Some of the operations related to the design and administration of the questionnaire and the processing and analysis of the data are delegated to third parties.

A major advantage of international surveys is that they allow organisations to directly ask targeted respondents questions that are relevant to statisticians and policy makers. As a result they usually provide much richer information than can be collected through national data from the member countries' ministries and statistics offices. For example, the OECD can now directly ask 25-64 year-olds a range of questions and measure their literacy, numeracy and ICT and problem-solving skills through the Survey of Adult Skills, providing a dataset on skill levels that is comparable across countries. The survey also provides other information that enables analyses which would not otherwise be possible. For example, data from national labour surveys can provide the employment rate of tertiary educated 25-34 year-olds but data from the Survey of Adult Skills can complement this information with data on the employment rate of tertiary educated 25-34 year-olds whose parents were not tertiary educated ("first-generation" tertiary graduates) by asking respondents specific questions about this matter.

The great flexibility of international survey data, in terms of the variables on which it is possible to collect data, comes with a few drawbacks. One of the most important problems is that the sample size is usually smaller than what can be achieved by national ministries and statistics offices which can often conduct larger-scale surveys (not to mention administrative data, which ideally cover the whole population). A smaller sample size implies that the confidence intervals for the statistics of interest must be wider, independently of the fact that the sample is correctly constructed and is representative of the population. Hence, some levels of disaggregation of the information cannot be reached without largely decreasing the statistical confidence in the results. For example, *Education at a Glance 2015* (OECD 2015, Table A6.1a) reports the relative earnings of women aged 25-34 by their tertiary education qualification: short-cycle tertiary degree, bachelor's or equivalent level and master's or equivalent level. This analysis is based on data that typically come from labour force surveys, which involve large samples of adults. Using data from the Survey of Adult Skills at such a level of disaggregation would not be recommended because of the smaller number of observations.

An additional issue concerning international surveys is that, in general, asking the same questions to people from different countries is not enough to guarantee comparability of the results. The same questions or assignments may have different meaning in different cultures or national contexts (Kankaraš and Moors, 2010). Even putting aside this problem, sometimes people answer survey questions in a different way from what researchers would expect, making the interpretability of the data difficult (Bertrand and Mullainathan, 2001).

In the case of the OECD surveys, the problems of comparability and validity of survey responses are minimised through an extremely careful design and the application of state-of-the-art methodologies to carry out its surveys (see OECD, 2014b, for PISA and OECD, 2013, for the Survey of Adult Skills). For example, the 2012 PISA sample was constructed through a two-stage stratified sample design. Schools were the first-stage sampling units, and they were sampled systematically from a comprehensive national list supplied by the national authorities of each country, with probabilities that were proportional to the size of their student population. The students, chosen from a list of all eligible students in each school, represented the second-stage sampling units.

Comparisons between different international definitions and data sources

Besides continuously refining its state-of-the-art methodologies for international surveys, the OECD also relies on a variety of data, including national surveys and register data. This way, the OECD combines the strengths of different data sources, exploiting in full the analytical possibilities offered by the available information. In addition, the OECD is constantly working to improve the statistical definitions and the data collection procedures that it uses, to further increase the scope and the reliability of education statistics.

As a result, the OECD database can answer a variety of policy questions on tertiary education. For example, data are available on the number of students enrolling and graduating; the number of personnel involved; the expenditures in core education services and in research and development, on the earnings, skills and employment rates of graduates; education mobility (students achieving tertiary education with parents with at most an upper secondary diploma); the level of tuition fee and student financial support, etc. In addition, the collection of statistics on tertiary education is expanding as INES and related networks develop a variety of indicators on completion rates; selectivity of tertiary education institutions; and equity in tertiary education, and add further breakdowns of data by field of study; ISCED level; etc. (Marconi, 2015).

The large and expanding work of OECD implies that different definitions and data sources can cover similar concepts or measures at times. This is not a sign of low quality of some existing definitions or data sources, but rather a natural characteristic of an extremely large and comprehensive database. However, in some cases it can lead to some confusion for readers who are not used to this complexity.

Two typical sources of confusion can arise when similar indicators are collected according to different definitions, or compiled from different data sources. The next subsections provide an example of these issues through two cases that are particularly relevant to tertiary education. The first case relates to the difference between the definition of international and foreign students. The second case deals with the rate of employment of 25-34 year-old tertiary education graduates, which can be calculated using data from large-scale national labour force surveys and from the Survey of Adult Skills.

Mobility in tertiary education as measured by international and foreign students

Up until 2015, countries supplied data both on international and foreign students for the UOE data collection. However, the relative number of international students has now become the preferred criterion for measuring mobility in tertiary education (the reason for this will become clearer below). As a result, from 2015, countries have been asked not to report data on foreign students, as long as they are able to supply data on international students. This section will use data from the 2014 UOE collection and will therefore compare data on both international and foreign students for the academic year 2011-2012.

International students are those who have crossed borders for the purpose of study. The UNESCO Institute for Statistics, the OECD and Eurostat define international students as those who are not residents of their country of study or those who received their prior education in another country. On the other hand, foreign students are students who are not citizens of the country in which they study; as a result the concept of foreign students mixes student mobility and other migration patterns.

The number of foreign students tends to be larger than the number of international students, because usually international students are also foreign students, but not vice versa.[1] The difference between the two numbers is due in large part to non-national students who migrated to a country for a reason other than study (for example, they followed their parents when they were children, or they came to find work)

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[1] An international student is usually a foreign student, but this is not necessarily so. For example, the UK defines international students according to the criteria of 'usual residence'. Hence, British citizens who enrol in a tertiary education programme in the UK, but whose usual residence has been outside that country, are considered international but not foreign students.

and they subsequently decided to enrol in a tertiary education programme in that country. These students count as foreign students, but not as international students.

Figure 3.2 shows that the number of foreign students is always larger than the number of international students. This is expected, as the set of international students is mostly included in the set of foreign students. If we estimate the correlation between international and foreign students for all countries with available data for 2012, we find a very high coefficient: 0.97.

However, even such a high correlation coefficient masks some differences at the country level. As OECD comparative data are important for the single countries to assess their situation vis-à-vis the other countries, these differences are consequential.

The largest relative difference between the two indicators is observed in Norway, where the number of international students is less than a third the number of foreign students. The other countries in which international students are less than 60% of the total number of foreign students are Canada, Chile, Ireland, Estonia, New Zealand and Spain. There are four countries in which the difference between the number of international and foreign students is smaller than 10%: Japan, the Netherlands, Poland and the Slovak Republic.

In absolute terms, some of the largest differences are observed in countries with high immigration rates and also high enrolment rates in tertiary education, such as the United Kingdom, Switzerland, or New Zealand. Luxembourg is always a special case in terms of labour and education mobility, with a large number of commuting foreign workers (Nerb et al., 2009) and students coming from neighbouring countries (for example, about 60% of its international students are from France, Belgium or Germany, OECD 2015).

The most relevant definition therefore to investigate student mobility is that of international students and the OECD always shows data on international students if possible. If international student data are not available for some countries it presents data on foreign students separately for that subset of countries (as a proxy for international students). The differences between the two measures reported in Figure 3.2 show that the work done with the member countries to provide data on international students is particularly valuable as foreign students is not always a good proxy for international students.

Figure 3.2: International and foreign students as a percentage of total enrolment, academic year 2011-2012
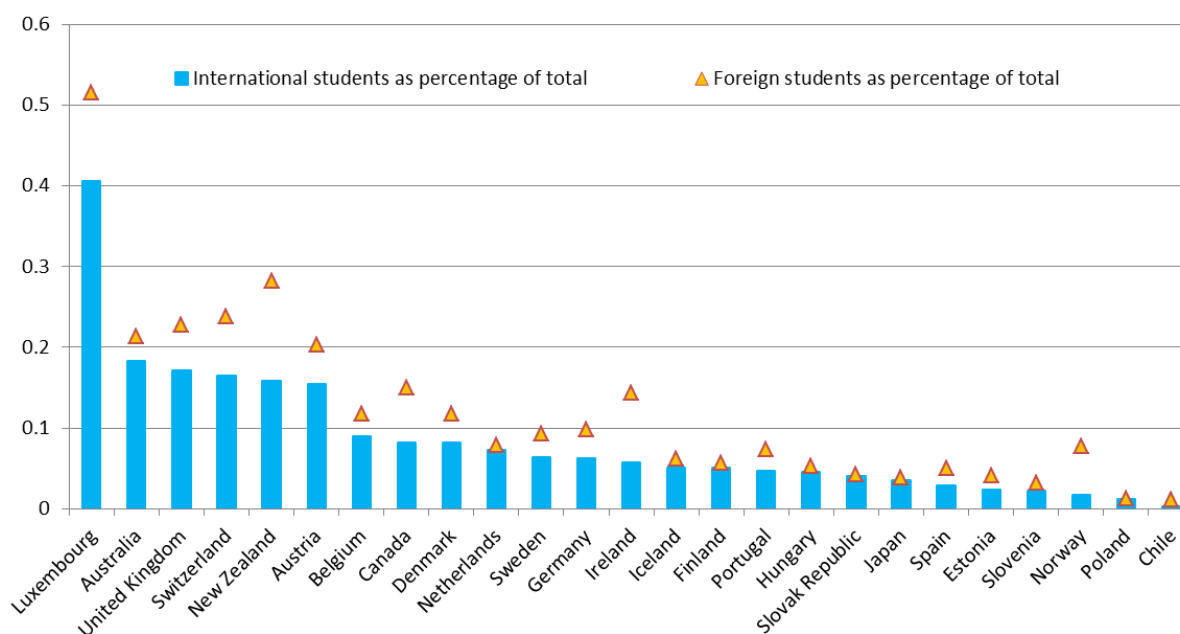
Source: OECD Education database, retrieved from stats.oecd.org on February 4, 2016.

Employment rate of young tertiary graduates from different data sources

Education at a Glance also publishes the employment rate of young (25-34 year-old) tertiary graduates in a number of OECD and partner countries (e.g. OECD 2015, Table A5.3a). This metric is of great interest to policy makers as it helps them understand whether young people who obtained a tertiary degree are able to find employment. In the same publication, it is also possible to find an estimate of the employment rate of young tertiary graduates by the education level of their parents (OECD 2015, Table A4.2d). This indicator shows that first generation graduates (i.e., those whose parents have not attained tertiary education) are not substantially less likely to be employed than other graduates.

A reader who is unaccustomed to the data sources used by the OECD may be surprised by the fact that the year of reference is 2014 for the overall employment rate, and 2012 for the rate by level of parental education. This is due to the fact that the former indicator is calculated on the basis of responses to the national labour force surveys (for OECD countries) which are annual. However, to calculate the employment rate by level of parental education more specific information is needed which is not always available in labour force surveys. This indicator is thus calculated using data from the Survey of Adult Skills which is not annual. Hence, the data refer to the year in which the last Survey of Adult Skills was conducted.

To obtain the employment rate of young tertiary graduates for 2012 based on national labour force surveys, one can consult *Education at a Glance 2014* (OECD 2014a, Table A5.3a). Again, however, one will notice that the employment rate reported there is not perfectly comparable to the employment rates of first-generation and other tertiary education graduates as calculated from PIAAC data. For example, the employment rate of tertiary educated 25-34 year-olds for Italy in 2012, as reported in *Education at a Glance 2014* (OECD 2014a, Table A5.3a) is lower than the employment rate for the same age group, country and year for both first generation and other tertiary graduates.

Differences such as these are to be expected when comparing different data sources. Although the definitions used are in principle the same in the Survey of Adult Skills and in the national labour force surveys, some differences can persist due to different sampling procedures; non-response rates; and many other factors. For example, Mikucka and Valentova (2013) note that the employment status of women in parental leave is coded differently in different national labour force surveys, although the definitions are in principle the same. In addition, responses to national labour force surveys are systematically collected throughout the year, whereas responses to the Survey of Adult Skills have been collected during periods of three to eight months, depending on the country (OECD, 2013). This difference could be relevant to the calculation of employment rates, given the seasonal variation typically associated to this indicator.

This is why *Education at a Glance* (e.g. OECD 2015) uses the Survey of Adult Skills for answering some specific policy questions, but ultimately reports only one estimate for the overall employment rate of tertiary educated 25-34 year-olds. This is the estimate based on the national labour force surveys, which is considered to be more reliable because of the larger sample size and because these surveys are specifically designed to measure employment and related variables (see Eurostat, 2015, for a review of national labour force surveys in Europe).

For the purpose of this chapter, it is nonetheless useful to calculate the overall employment rate of tertiary educated 25-34 year-olds in 2012 based on the two sources that have been discussed (the Survey of Adult Skills and the national labour force surveys) for the countries with available data. On average across the countries with available data, the estimated employment rate is slightly (3 percentage points) higher for the estimate based on the Survey of Adult Skills than for the estimate based on the national labour force surveys. As it is evident from Figure 3.3 a similar situation holds for a large majority of the countries: in two thirds of the countries, the estimate based on the Survey of Adult Skills exceeds the other estimate by an amount between 0 and 4 percentage points. However, for a few countries the difference between the two estimates is substantial: it exceeds 7 percentage points in the Czech Republic, Estonia, Italy and the Slovak Republic. It is interesting to notice that the average size of the sample of the tertiary educated 25-34 year-olds in the Survey of Adult Skills for these four countries (396

observations) is substantially smaller than for the other countries (608). This could be a possible explanation for the divergence in the two estimates.

Figure 3.3: Employment rate of tertiary educated 25-34 year-olds in 2012 based on the Survey of Adult Skills and the national labour force surveys
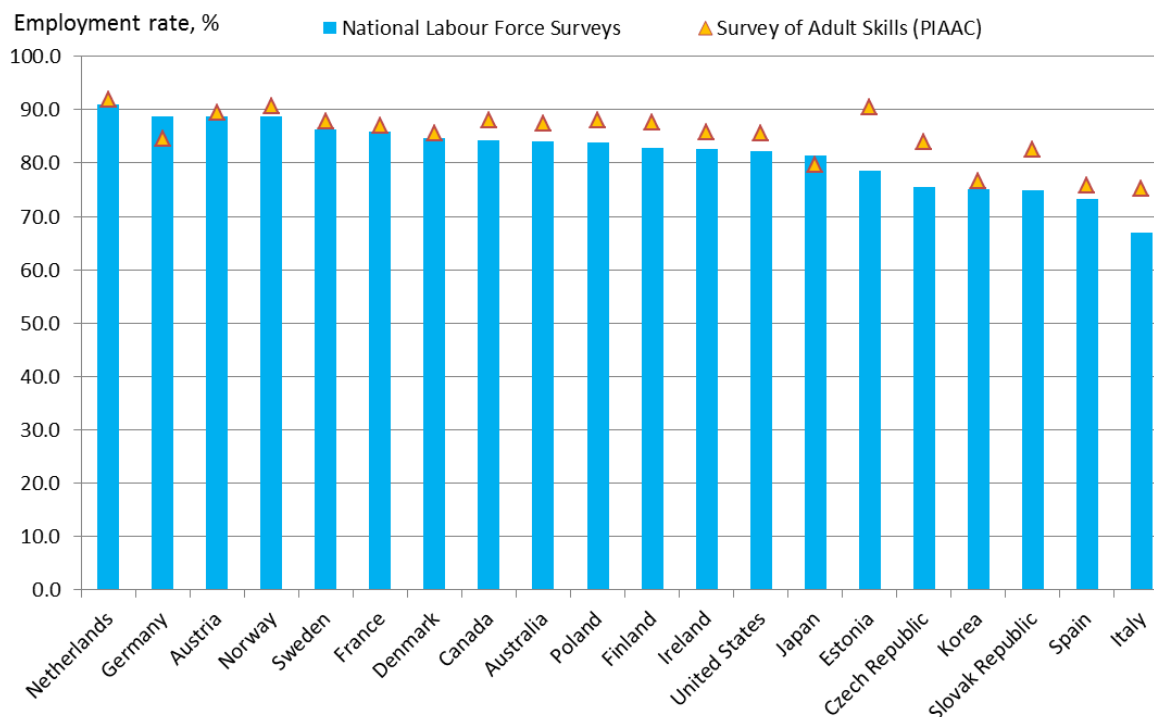
Source: OECD (2014a, Table 5.3a), and PIAAC data base.

Conclusion

The effective collaboration between the OECD, UNESCO, Eurostat and their member countries has facilitated the development of a rich set of data and provided immense value for money for member countries of each organisation by reducing the duplication of work and effort. The establishment by the OECD of the INES project in 1991 has driven the development of an increased number and variety of available international education indicators available to researchers and policy makers, similarly to the launch of the PISA and other programmes. These initiatives have provided unprecedented opportunities for data analysis and policy discussions.

The expansion and updating of the existing databases require national authorities and statistical offices and international organisations to use a variety of methods to collect data and actively engage in an ongoing debate on the underlying methodology of the data. In other words, the international community is continuously working together to improve the definitions of the collected indicators and data collection procedures.

The OECD collects international education statistics through the collection and validation of data from official surveys, but also through the development and administration of international surveys of individuals or institutions. The key advantages of these two methodologies have been discussed – official statistics can provide very robust data by drawing on very large samples or even on the whole population, whereas international surveys allow for richer data and more flexibility by asking targeted respondents direct and policy-relevant questions.

The two cases presented illustrate some of the differences that can arise when different definitions or data sources are used for collecting similar indicators. The first case is that of international mobility, as measured based on the more appropriate definition of international students or on the definition of

foreign students (which is still used by some countries which cannot distinguish in their data collection between international and foreign students). The differences between the two measures reported in Figure 3.3 show that the work done by the OECD, together with its member countries and other international organisations such as Eurostat, to publish data on international students instead of foreign students is particularly valuable, as the two measures do not yield similar results.

The second case is that of the employment rate of tertiary education graduates aged 25-34, which can be calculated by using data from the Survey of Adults Skills or from national labour force surveys. The data illustrated in this chapter show that there are some differences in the two rates of employment, as could be expected given that the data sources are different. In these cases, the strategy of the OECD is to publish the indicator as derived from the national labour force surveys, because the sample size is larger than for the Survey of Adults Skills and hence the precision of the estimates is higher.

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CHAPTER 4 – ENHANCING RELEVANCE IN HIGHER EDUCATION

Ana Godonoga

Introduction

As higher education has expanded and opened up to a more diverse body of students, it has become increasingly accountable to a wider range of stakeholders, including students and families, graduates entering the labour market, employers, and other members of society. Although these groups may have different objectives and motives (OECD, 2008b), they all expect higher education to be of high quality and relevant. An emphasis on quality and relevance in higher education was one of the common policy themes in the OECD thematic review of tertiary education in the mid-2000s (OECD, 2008b) and ensuring that high quality and relevant higher education continues to be at the forefront of policy agendas across the world. For instance, Ministers from the European Higher Education Area at the 2015 Yerevan conference stated that "enhancing the quality and relevance of learning and teaching is the main mission of the European Higher Education Area" (Bologna Process, 2015: 2).

This chapter aims to identify some of the ways in which relevance in higher education can be enhanced. This chapter is organised as follows. First, it reflects on the factors that may influence how relevance is defined and accounted for in the higher education policy agenda. Second, it presents four categories of policy levers, commonly used by state authorities to steer their institutions to promote relevance within their higher education systems. Third, it provides a mapping of policy areas whereby the relevance of higher education can be enhanced at the system level and across the main functions of higher education – education, research and engagement with the wider world. The chapter concludes with a reflection on how institutions, by understanding the policy mechanisms applied in their national contexts, can design better institutional strategies to ensure that higher education delivers good outcomes and remains relevant to its stakeholders.

Factors that influence relevance in higher education systems

But what is relevance in higher education? Relevance in higher education is a relative term that can be defined and interpreted differently across countries and stakeholders. This chapter refers to some of the broader factors that are likely to drive relevance within higher education systems, reflecting on the role of **context**, **the structure, organisation and governance of higher education** and **stakeholder engagement**.

Context is an important factor affecting the performance in higher education and its relevance. Economic, social, cultural and environmental conditions are all part of a country's context, and although they are regarded more as external forces, they play an important role in priority setting for higher education and determining what is relevant in a higher education system. Socio-demographic trends, such as ageing, have serious social and economic implications, putting pressure on public expenditure, changing skills needs and giving rise to new categories of learners. Immigration, globalisation, internationalisation and open trade policies have also led to shifts in cultural capital, exposing higher education institutions (HEIs) to culturally diverse groups with different beliefs and values systems. To build and sustain their knowledge economies, some countries have increased efforts to attract and retain international talent (OECD, 2008b). Respectively, these trends put pressure on institutions to adjust the education provision and strengthen capacity for internationalisation. Thus, context sets the scene for higher education policy makers to determine what aspects are relevant when establishing priorities and goals, and how to ensure that institutions work towards achieving them.

The **structure, organisation and governance of higher education** also drive relevance within higher education systems. Countries vary considerably in the way they set the legal framework and share responsibility for higher education. Across OECD countries, there is a diverse range of governance arrangements, each with their own steering models. These models vary from centralised policy making in

countries such as Austria, France, Greece, Hungary, Israel, and Italy, to decentralised systems with autonomy devolved to regional levels, such as in Canada, Belgium, Germany, Switzerland, the UK, or the US (OECD, 2015b). Across and within countries, institutions may operate under the framework of state agency or that of a legal independent person. Institutions are also highly diverse, operating in unitary or binary systems, in public or private sectors, being for-profit or not-for-profit. Governance arrangements are crucial in determining what relevance means for the higher education sector, and how policy frameworks are translated into practice.

Stakeholder engagement in higher education also influences the way relevance is defined and reflected into policy agendas. Stakeholders are individuals or organisations that can affect or be affected by an organisation's actions (Johnson and Scholes, 1999). HEIs are no longer "ivory towers", operating in isolation from society. The three functions of higher education – education, research, and engagement with the wider world – have become equally relevant and important for the development of national, regional and global communities. To ensure that higher education is tailored to meet the challenges of modern nations, members of society (including students, employers and trade unions, businesses, lobbyists, researchers, and other higher education stakeholders) are participating increasingly in strategic decisions and contributing to the development of higher education (OECD, 2008b). Some countries may encourage or even require employer representation on governance boards or quality assurance units to strengthen relevance to the world of work and promote good graduate outcomes. Others may create different channels to involve students and alumni in the design of education to boost satisfaction with the study experience and also to promote relevance in terms of personal development. Universities striving to contribute to prosperity in their regions may invite regional actors to partake in decision-making and in developing education geared towards regional development. Therefore, the extent and type of stakeholder involvement in higher education is likely to bring a wide variety of perspectives on what relevance means and how it can be operationalised. The challenge for state officials is how to integrate these perspectives into policy so that a consensus over priorities and relevance can be reached, and HEIs become engaged in policy implementation.

Driving relevance in higher education through policy levers

Governments, through their steering capacity, can drive HEIs to promote relevance, meet priorities and achieve desired outcomes. At the same time, in the wake of globalisation and internationalisation, governments need to ensure that policies are designed to address national needs while maintaining the relevance and competitiveness of their education systems in the global market.

Governments steer their higher education through so-called policy levers, defined as "governing instruments which policy makers have at their disposal to direct, manage and shape change in public services" (OECD, 2015b: 29). Policy levers serve to influence organisational behaviour through steering tools and institutional arrangements. Based on the work of Hood and Margetts (2007), Howlett (2011) and van Vught and de Boer (2015), policy levers can be classified according to four types of steering mechanisms: **regulation, funding, information** and **organisation.**

Regulation refers to government's authority in setting conditions that allow or forbid institutions to act in certain ways. The degree of restriction or leeway that state officials give to institutions varies across countries and it depends largely on the model of governance and institutional autonomy. Governments can regulate their systems of higher education more broadly, i.e. by adopting or making changes to legislation, enacting decrees, setting forth national frameworks and development plans, or by focusing on more specific aspects, i.e. by centralising admissions, setting forth eligibility requirements for entry into certain study programmes, or making external stakeholder representation on governing boards a legislative requirement. Through regulatory mechanisms, states can directly influence substantive aspects of the education provision (i.e. making specifications on the content of certain disciplines). Or they can "steer from a distance" (Neave and van Vught, 1991), meaning that governments set general standards and procedures for higher education, and institutions need to decide how to organise their activities in a way that conforms to these standards (Berdahl, 1983).

Steering through **funding** involves the use of financial incentives to prompt desired behaviour in higher education. Unless used for capacity building, funding levers often require higher education systems to have an already existent infrastructure (i.e. physical and human resources) to be fully effective. Governments can target funding to institutions (formula or targeted operating grants, performance-based funding), or to students and families (financial aid, vouchers or tuition fee waivers). To steer higher education towards the needs of employers, policymakers can finance graduate career surveys or provide grants for institutions to establish programmes that are in demand on the labour market. Policymakers can also design student aid schemes that support participation, or can link funding to enrolment targets (Jones and Field, 2013).

Information can be used to collect and disseminate data on different aspects of higher education that may be of relevance to students and families, alumni, employers and other members of society. For instance, to promote internationalisation, governments may establish online portals to market the benefits of mobility programmes, or may participate in international education fairs to enhance the visibility of domestic programmes to foreign students. Governments may also fund web portals to enable students to access information about different education providers, courses and student outcomes.

The fourth category of policy mechanisms pertains to **organisation**. Governments can use their organisational resources (i.e. their agencies and the personnel working in them) to help achieve their goals by steering or influencing higher education systems or delivering goods and services. This category also includes measures directed at different organisational aspects, including those related to learning and teaching. Governments may establish career centres inside HEIs to facilitate students' transition to the labour market, create specialised units or agencies to promote internationalisation efforts, or introduce study programmes geared towards certain groups of learners (i.e. professional specialisation studies for those who are already employed).

Often policy initiatives combine more than one policy lever simultaneously in order to enhance the effectiveness of the policy. Governments can design and implement policies that are more **comprehensive**, i.e. they aim to steer and enhance relevance **at the system level**, or can set **targeted policies** to encourage change and influence relevance **across the key functions of higher education** (OECD, 2015b).

A mapping of policy areas whereby relevance can be enhanced

This section provides a mapping of a number of policy areas which governments can use to enhance relevance in higher education. It maps broader policy themes that are concerned with driving change at the system level and presents more specific policy areas where relevance can be improved across the education, research and engagement functions.

Enhancing relevance at the system level

Diversifying education provision

In response to the need to make higher education relevant for different groups of stakeholders, policymakers can promote measures to diversify their systems. According to Varghese (2014, 16), diversification refers to "the process by which a system becomes more varied in its orientation and operations". The need for diversification in higher education resulted from various factors that emerged after the 1960s and have been driving change within national systems and institutions ever since. The expansion of higher education resulted not only in a rise in *numbers* but also in *types* of students, which nowadays includes both traditional and non-traditional learners (part-time, international, professional, retired). All these groups have different motivations and learning needs, which calls for institutions to deliver education that is more diverse, flexible and student-centred. Labour markets, too, have been shifting towards more knowledge-intensive and creative jobs, which require skills and knowledge that can no longer be fulfilled by traditional university programmes. In light of such transformations,

diversification has become an important strategy to accommodate the growth in student numbers, the diversity of student needs, and the changing landscapes of knowledge economies.

One of the most visible forms of diversification in higher education refers to **types of education providers**. Many countries, in response to expansion trends and labour market demands have switched to binary models, which are comprised of a university and a non-university sector. Examples of institutions included in the latter are, inter alia, the *Instituts Universitaires de Technologie* in France, the *Fachhochschulen* in Germany and Austria, the Universities of Applied Sciences in the Netherlands and Finland, the district colleges in Norway, the regional technical colleges in Ireland, and the community colleges in the United States (Beerkens-Soo and Vossensteyn, 2009; Kyvik, 2009). These institutions, compared to traditional universities, are known to deliver education that is more applied and work-oriented. Some provide short-cycle, fast-track or associate degrees tailored to the needs of working professionals (i.e. the Associate Degrees introduced in the Dutch system). Others have a strong regional focus and are located strategically in geographical areas that are in need of development (i.e. universities with a regional focus in Sweden or Finland).

Furthermore, the growing demand for higher education, accompanied by deregulation and decentralisation trends, have led over time to a sharp rise in the **number of private providers**. In Chile, Japan and Korea, for example, more than 70% of higher education students are enrolled in private independent institutions (OECD, 2015a). These transformations have also influenced the diversity of funding sources for higher education. Across OECD countries, on average, 30% of funding for tertiary education comes from private sources (OECD, 2016). In Chile, Japan, Korea or the US, more than 60% of funding for tertiary education is private.

In addition to institutions and programmes, **delivery modes** have also become more diverse. Traditional face-to-face learning is frequently combined with other forms of provision, such as distance learning, e-learning and blended learning. Universities are increasingly using Massive Open Online Courses (MOOCS) and flipped classrooms (form of blended learning that reverses the traditional learning environment by delivering instructional content online, before the class session) to make higher education accessible to a wider audience and make the learning process more effective for more students. The UK-led FutureLearn, for instance, is a massive open online course learning platform, which comprises more than 80 national and international partnerships, including non-university actors (museums, councils, libraries and journals). Less frequently employed but nevertheless on the rise has been the provision of online degree courses and joint online learning with other HEIs. Countries like Bulgaria, France and Slovenia have national policies or strategies to explicitly enhance e-learning activities within higher education (Gaebel et al., 2014). Croatia, the Czech Republic, Greece, Ireland, Germany, the Netherlands and Malta have set forth national-level support measures for the development of e-learning initiatives. Notable progress has been made across many OECD countries in advancing opportunities for online provision. In Germany or Spain, for example, more than 50% of higher education students participate in e-learning activities (Gaebel et al., 2014).

Linking funding to national priorities

Funding is an important policy instrument in driving relevance in higher education. Funding does not consist only in distributing resources to universities and students. Funding is an element of the broader governance framework, which is used by state authorities to align national priorities with the functions and activities of higher education and establish incentives to steer behaviour and achieve desired goals.

Expansion and privatisation trends have resulted in a large variation of models, sources and levels of funding for higher education over recent years. Evidence shows that OECD countries spend an average of 1.6% of GDP on higher education, including R&D activities (OECD, 2016). Of this number, approximately 1.1% comes from public and 0.5% - from private sources. This trend is reversed in countries like Australia, Chile, Japan, Korea and the US, where most of the expenditure on higher education is private.

There are two ways governments can fund their higher education systems (Salmi and Hauptman, 2006). They can provide funding directly to institutions to support their learning and teaching, research, engagement and operational activities, and they can offer subsidies or financial assistance to students

and families. Direct funding is allocated through **block grants**, or via **line-item budgeting**, the latter becoming less frequently used especially in systems with higher levels of institutional autonomy (Estermann et al., 2013). Block grants are generally given in the form of lump sums and institutions need to distribute them internally according to their priorities and objectives. The amount of block grants provided to HEIs may be determined based on historical data, through negotiation, via a funding formula, or a combination of these modalities (Estermann et al., 2013). Governments can link funding to national priorities and allocate resources to promote equity (New Zealand and Australia), regional development (Finland and Japan), or internationalisation (Norway and Poland).

Another model that is gaining importance, especially in a context that calls for a balance between institutional autonomy, quality and accountability, is **performance-based funding** – "a type of funding where the (public) budget of an HEI varies with the performance of the institution" (De Boer et al., 2015: 8). Governments may develop indicators to assess how their HEIs are performing in key areas. For instance, performance indicators for learning and teaching include the number of bachelor and master's degrees in Austria and the Netherlands; and the number of credits earned in the Flemish Community of Belgium, Norway, Sweden, Denmark and Finland. Indicators for research include research productivity in Australia, Denmark, Finland, and the Netherlands; and research contracts in Australia, Finland, Ireland and Scotland. Other indicators are used to promote the internationalisation of students and staff (Finland), knowledge transfer activities (Australia, Austria and Scotland) and access to underrepresented groups, as it is done in Australia, Ireland and various states in the US (De Boer et al., 2015; Estermann et al., 2013).

Apart from direct funding, governments can also support higher education by making **financial aid available to students and families**. This contribution is particularly valuable in times of raising costs and affordability concerns. Student aid models vary widely across OECD member states. They can be delivered in the form of **scholarships, grants, vouchers, student loans, or tax exemptions**, each having specific eligibility criteria. Hungary's Tied Student Loan Programme (2012), for instance, provides loans with low interest rates to students who are not eligible for study grants. Similarly, Japan's Scholarship Loan Programme (2012) gives interest-free loans that can be repaid based on an income-contingent scheme (OECD, 2015b). The UK offers a range of scholarships, study loans and course grants to increase the participation of both full-time and part-time students (Broek and Hake, 2012). Germany, Austria and France have been using universal aid programmes designed specifically to support participation (Jones and Field, 2013).

To ensure their long-term sustainability and to compensate for reductions in public budgets, HEIs are increasingly looking to **external channels** to fund their activities. **Research contracts with private partners, endowments and philanthropic income,** among other initiatives, are becoming more visible in the funding profiles of universities. These elements have also started to appear in the funding formulae, which are used by state authorities to encourage institutions to pursue partnerships and diversify their income sources.

Strengthening internationalisation efforts

In an era where institutions of higher education are competing to become leaders in the global knowledge economy, internationalisation has attained special attention from education policy makers. For instance, the European Commission, in its most recent Education and Training Monitor report, has recognised internationalisation and mobility as drivers of relevance in higher education (EC, 2016). "Internationalisation", defined in simple terms, is "increasing cross-border activities amidst the persistence of borders" (Teichler, 2009: 1). Internationalisation also refers to the process of integrating an international, intercultural and global dimension into the core functions of institutions, namely education, research and engagement (Knight, 2008; Knight et al., 1997). Cross-border activities refer to all initiatives set forth to enhance the international mobility of students, teachers, programmes and institutions (Knight, 2004; Vincent-Lancrin et al., 2015).

Initially, cross-border education emerged as a way to promote student mobility (OECD, 2006). Over time however, the field expanded in scope and breadth and now includes a wide array of activities, including

staff exchanges; internationalisation through knowledge transfer; branch campuses; franchised degree programmes; internationalisation of the curriculum by enhancing capacity for learning and teaching in foreign languages; the establishment of courses focused on cultural and regional studies and the delivery of English-taught courses and/or programmes in countries where it is not the native language. Progress is reflected in the figures. In 2013, on average, 6% of all students in tertiary education in the OECD area were international or foreign students, with 4.9% enrolled at the bachelor's level, 12% at the master's level, and 27% at the doctoral level (OECD, 2016). Cross-border education has also become an important commercial good on the international trade market. In Australia, for example, international education (i.e. education-related personal travel) is its third largest export and is its largest services export (Australian Government, 2016).

Depending on the country context, policy makers can design various instruments to enhance the relevance of their higher education systems to a global audience. For example, state officials can develop **internationalisation strategies** or make **internationalisation a national priority** (e.g. Australia, Canada, Finland, Germany, New Zealand, Norway and Switzerland). Governments can also allocate **mobility grants and scholarships** or **offer subsidised tuition to foreign students** (e.g. Australia, the UK and for EU students). Internationalisation can also be enhanced by **marketing and promoting a country's higher education system abroad**, with the help of initiatives such as the German Academic Exchange Service (DAAD), the British Council, or EduFrance.

Recognising that internationalisation, without an adequate monitoring and student protection, can have implications on the quality of education, some countries, such as Australia or the UK, introduced quality assurance for the educational services they export to overseas partners (Altbach and Knight, 2007). Similarly, Israel, where a number of foreign HEIs operate, has developed a system to monitor and evaluate the quality of its imported educational services (Altbach and Knight, 2007). This trend has given rise to the commercialisation of accreditation agencies in some countries. For example, the US provides accreditation services in more than 65 countries (Altbach and Knight, 2007).

The OECD and UNESCO jointly developed Guidelines for Quality Provision in Cross-Border Higher Education, which was adopted by the OECD Council as a Recommendation in 2005. A recent monitoring report, which evaluates the degree of compliance of different countries with the respective guidelines, showed that most of the surveyed participants **have regulatory frameworks for cross-border education** (Vincent-Lancrin et al., 2015).

While countries across the world have made substantial progress in making their higher education systems more internationalised, results of a survey administered to member countries of the European University Association reveal that improvements in reforms are still required, particularly when it comes to regulation and funding of cross-border activities and building language capacity for internationalisation (EUA, 2013).

Enhancing relevance across the functions of higher education

Fostering closer links between research and innovation

Higher education, research and innovation are increasingly regarded as core elements of a country's knowledge system, which is defined as "an organized structure and formal process for generating and representing content, components, classes, or types of knowledge" (Meek and Davies, 2009: 46). Many OECD countries have developed national strategies and policy frameworks to capitalise on their higher education systems' potential to deliver relevance through research and innovation. Such frameworks often comprise a mix of policies such as **setting research priorities to meet national needs**, **assessing research outputs**, **adjusting governance and funding models with stronger emphasis on research and innovation**, and **establishing designated units to facilitate and promote cooperation between institutions and industry**.

OECD members recognise the importance of investing in research and development (R&D) for economic growth and between 2003 and 2013, gross domestic expenditure on R&D in the OECD area increased from 2.1% to 2.4% (OECD, 2015c). Applied research and experimental development across the OECD area

have more than doubled since 1985, reaching 21% and 62% of gross domestic expenditure on R&D (OECD, 2015c). However, there are significant differences across countries. In a number of countries, such as Israel, Korea, Japan, Finland, Sweden and Denmark, more than 3% of GDP is spent on R&D, while in others, such as Chile, Mexico, Greece, Slovak Republic and Poland, less than 1% is allocated for this purpose.

Many countries **have reformed their financial aid models to incentivise students to pursue doctoral studies** or **have introduced new indicators into performance-based funding models to enhance research performance** and **encourage knowledge transfer activities** (De Boer et al., 2015). Others have **incorporated a professional dimension into their study programmes** to build closer ties to industry and promote innovation (Dill and van VughtVan Vught, 2010). German universities, for example, have established Research Training Groups to enhance national research capacity and promote young researchers. The Netherlands has been active in developing high quality research capacity by funding centres of excellence (Jongbloed, 2010). Research Excellence Initiatives (REIs) have also expanded over the years, with two-thirds of OECD countries currently engaging in like activities, compared to less than 10% in the 1990s (OECD, 2014).

Local, regional and international cooperation in research and innovation has been another major trend that gained force at the turn of the century. Since 1996, international collaboration in research has nearly doubled, covering almost 20% of all scientific publications (OECD, 2015c). Collaboration between HEIs, research organisations and firms has also become more prominent, although this trend has been two to three times more common in large firms than in small and medium-sized enterprises (SMEs). SMEs in countries like Slovenia, Finland and France have been somewhat more active in collaborating with HEIs and research organisations, compared to those in countries like Brazil or Chile (OECD, 2015c).

A fundamental change in the policy approach to innovation has been **the move from the traditional linear model** which views basic research as sufficient to promote innovation capacity **to a context of national innovation systems**, which comprise "complex institutional landscapes that influence the creation, development, and dissemination of innovations" (Mowery and Sampat, 2009: 2). National innovation systems reflect more interdependent, interactive and reciprocal linkages between different actors and organisations (van Vught, 2009). Linkages between education, research and innovation, also referred to as the Knowledge Triangle (Maassen and Stensaker, 2010), have become increasingly important in building and sustaining innovation systems, and fostering job and economic growth.

Improving opportunities for continuing education

Continuing education plays an important role in building and sustaining a relevant and productive labour force. The demand for adult and continuing education from the employer side has grown over the years and will continue to do so as skill-intensive jobs become more widespread and demographic conditions make labour markets increasingly reliant on the productive potential of adult workers (Cedefop, 2010; Maselli, 2012). Between 2010 and 2020, the European labour force aged 15 or above with high-level qualifications is predicted to increase by at least 15 million (Cedefop, 2010). These structural transformations will continue to increase the demand for further education, which must be adapted systematically to meet the skills requirements of today's dynamic knowledge economies.

The capacity of education systems to offer opportunities for formal, non-formal and informal learning and also the predisposition of employers to contribute to the professional development and upskilling of their employees are factors that influence both policy-making and practice in continuing education. Evidence shows **a large variation in adult learning activities** among OECD countries, with notable differences with respect to age and qualifications (OECD, 2012a). Results derived from the Survey of Adult Skills reveal that more than 60% of adults in Denmark, Finland, Norway, Sweden, the Netherlands, and New Zealand, participate in formal and/or non-formal education, compared to less than 30% in countries like Greece, Italy or Turkey (OECD, 2016). The total national investment on non-formal education per year, including that from public and private sources, amounts to an average of 54 hours per adult across OECD countries, with over 75 hours in countries like Korea, Spain and the US, and less than 30 hours in Italy, Lithuania, France or Slovak Republic (OECD, 2016: 367).

Education policy officials can take several measures to increase participation rates within adult and continuing education. One way is to i**mplement policy instruments aimed at removing demographic and social barriers** and **enhancing equity of access to continuing education** (EC, 2013). This can be achieved, for example, by **relaxing entry requirements to higher education** or **introducing alternative routes to enter study programmes**, **providing more diverse and open forms of education**, including part-time, distance and online learning, and **reforming funding for continuing education** to include more grants, tax incentives, education vouchers, and loans.

Germany, for example, offers exemptions to entry requirements to tertiary education by means of recognition of non-formal and informal learning outcomes (Werquin, 2010). A number of countries including Spain, Italy, Lithuania, Hungary, The Netherlands, the Czech Republic, Austria, Portugal, Iceland and Norway have legislation that allows institutions to recognise prior non-formal and/or informal learning (Eurydice, 2011). Finland, Sweden and France require institutions to implement systems for validation of such forms of learning. The Flemish Community of Belgium has also made higher education regulations more flexible by authorising credits earned outside the formal education environment. Finland provides funding to universities and polytechnics for the provision of open university and non-degree education. Tertiary education institutions in Ireland reserve a certain number of study places specifically for mature learners (Eurydice, 2011).

State authorities can also **adjust their national qualifications systems** to facilitate the access to higher education of adult learners. For instance, Belgium, the Czech Republic, Denmark, Estonia, Spain, Latvia, Poland, Austria, Finland and Norway allow learners to participate in examinations to obtain an upper secondary qualification without previous participation in an education programme (Eurydice, 2011: 37). Scotland has developed a national Credit and Qualifications Framework, which supports the participation of non-traditional students. Policy makers can also direct policies towards **boosting the knowledge and skills of teachers of further education**. In Norway, for instance, teaching methods tailored to mature learners are embedded in the curricula of regular teacher education programmes. Policies and practices in higher education can also become more **student-centred**, allowing individuals to express their needs and motivations for learning and tailoring the education provision accordingly.

Promoting knowledge transfer and commercialisation of research

One way higher education can enhance its economic and social relevance is through knowledge transfer and the commercialisation of research. Universities and research institutes are key drivers of knowledge and produce research outputs that can be used to address various societal needs. By exploiting this knowledge, firms and researchers themselves can generate economic and social value and industrial development (OECD, 2013). The process requires a high level of coordination and collaboration between various stakeholders, including higher education actors, technology transfer offices, public officials, industry representatives, and other members of society (Anderson et al., 2007).

OECD countries use a range of mechanisms and channels to transfer the knowledge produced by universities and public research institutes to industry. Notable practices have included **mobility programmes for researchers and academic staff**, **scientific publications**, **conferences, research contracts with industry partners**, and **licensing of university inventions** (OECD, 2012b). At the initial stage of these developments, the model used for the commercialisation of research was largely supply-push, rather than demand-pull, and universities and public research institutes sold or licensed their inventions to industry stakeholders without engaging with them actively to identify their needs. Over time, the supply-push and demand-pull models have become more integrated. As a result, the successful commercialisation of research must now have both an open science system (the supply side of knowledge) with effective channels for transferring research outputs, and an open innovation system (the demand side of knowledge), with continuous involvement of industrial actors in drawing ideas from universities and public research institutes. This trend enabled the introduction of two-way structures, such as public-private partnerships, joint research initiatives, technology licensing offices and university science and technology parks.

Countries such as Canada, Sweden and the Netherlands have taken an active stance in combining knowledge transfer activities with entrepreneurship, establishing university start-ups and business incubators, offering entrepreneurship mentoring and training for academics, and designing policies to build closer links between HEIs and SMEs. Norway has launched the FORNY2020 programme, through which national technology transfer offices receive funding to facilitate the diffusion of research results to the industry sector. Japan, Canada, the UK and the US have made efforts to accelerate the rate of knowledge transfer by improving their national patent systems, and gearing funding policies to support the involvement of SMEs in technology transfer ventures. Australia, Japan, and Denmark, among others, have created programmes and endorsed funds to build capacity in the commercialisation of intellectual property.

Strengthening cooperation between higher education and industry may also be achieved by **establishing industry-affiliated programmes inside HEIs**, **funding interdisciplinary research centres**, **engaging in contracted research**, **inviting industry stakeholders to become members of academic and research boards**, and **designing attractive incentives to encourage academic involvement in technology transfer activities**. Although initiatives for knowledge and technology transfer have expanded in recent years, the emphasis has been highly on commercialising research to the private industry and the manufacturing sector. Thus, policy makers and institutions could concentrate more efforts on enhancing the relevance of higher education to the service industry and the public sector as well.

Making higher education institutions more socially engaged

In addition to its traditional missions of educating (learning and teaching) and producing knowledge (research and scholarship), higher education can become more relevant to a broader audience by building closer links with society and ensuring it meets the needs of the wider community. Social engagement includes partnerships with the public and private sector to contribute to society and address societal challenges. Activities to support social engagement can include volunteering (by staff and students) in social organisations; providing expert advice; undertaking educational outreach and widening participating activities; and providing other services and facilities to the local community (E3M, n.d.).

However, the role of higher education in this area is less well developed and there is a high degree of variation across countries vis-à-vis various aspects of social engagement. For example, countries in Northern and Western Europe, such as Norway, Sweden, Denmark, and the Netherlands, exhibit a higher level of commitment to the practice of volunteering, compared to their counterparts in the East or South (Borgonovi and Miyamoto, 2010).

Evidence shows that countries with well-designed strategic frameworks and other **policy levers geared towards social engagement** are most successful in creating and sustaining links between education and the community (Cross and Pickering, 2008). For example, the National Co-ordinating Centre for Public Engagement (NCCPE) in the UK, which is funded by the UK funding councils, research councils UK, and the Wellcome Trust has been supporting public engagement activities in tertiary education institutions for almost a decade. The initiative is aimed at ensuring public engagement is a valued and recognised activity by staff and students and it helps HEIs develop a culture and institutional capacity for public engagement and establish effective partnerships with the community (NCCPE, n.d.). Finland's Jyväskylä University of Applied Sciences has been engaged with national and regional stakeholders in building employment opportunities for the long-term unemployed. Networks between HEIs, public and private stakeholders have been established in the Netherlands and the UK to revitalise rural areas (OECD, 2007a).

There is also evidence to suggest that individuals with higher levels of educational attainment are, on average, more likely to be engaged in their communities, compared to their counterparts with lower levels of education (OECD, 2007b). Findings from the European Social Survey and the Canadian Adult Literacy and Life Skills Survey reveal that higher education is particularly crucial in developing competences and attitudes related to tolerance and trust (Borgonovi and Miyamoto, 2010). In New Zealand, for example, evidence shows that individuals with higher levels of civic knowledge are more likely to show compassion and support for ethnic minorities compared to counterparts with no or low

development of such knowledge (OECD, 2012c). The development of the civic competences and behaviours communities need to overcome injustice and inequities, eradicate poverty, and advance tolerance, diversity and active citizenship can also be facilitated by engagement between HEIs and the community (Gertler and Vinodrai, 2005). The higher education system in Mexico is actively involved in building competences for active citizenship through a mandatory service requirement (Servicio Social), where students in public, and in some private institutions are required to complete a minimum of 480 hours of community service (Gardinier, 2017; OECD, 2008a).

Thus, national authorities, through a mix of regulatory, financial and information policy levers can steer institutions towards becoming more proactive in the way they engage with their communities. Policy makers can encourage institutions to **integrate social engagement into their missions and strategies**, **design education and research activities with a stronger focus on social impact**, **develop a multidisciplinary curriculum focused on experiential and work-based learning**, **cultivate civic competences through formal and non-formal education**, **integrate volunteering and community service into teaching and learning practices**, or **reward community-oriented methods of instruction** (Fitzgerald et al., 2012).

Conclusion

This chapter has illustrated different ways in which relevance in higher education can be enhanced. The views on what is relevant in higher education change according to the context within which systems are shaped, their structure, organisation and governance, and also the roles and functions of stakeholders. As the production of knowledge relies increasingly on input from multiple knowledge providers, perspectives on higher education relevance become more diverse (Gibbons, 1998). Relevance refers not only to matching higher education priorities with societal goals, but also to improving links between learning, teaching, research and innovation, developing student-centred learning environments, equipping graduates with knowledge and skills for personal and professional development, and strengthening capacity for economic growth and social well-being.

Governments, through their steering capacity, can drive HEIs to become more relevant to individuals and society. Policymakers can use a range of regulatory, funding, information and organisation levers to enhance the relevance and performance of their higher education systems. Policy levers can be more comprehensive and aim to enhance relevance at the system level – by promoting diversification and internationalisation, and connecting funding more closely to national priorities, or they can be targeted at enhancing relevance across the key functions of higher education – by building stronger linkages between research and innovation, encouraging knowledge transfer activities, creating opportunities for continuing education, and making HEIs more socially engaged.

Gearing policies to achieve social goals is only one step towards enhancing relevance in higher education and producing good outcomes for individuals and society. To be fully effective, policies need to be internalised by institutions and incorporated into their strategies and activities. To deliver relevant education, institutions need to understand how to position themselves in a way that responds to stakeholders' needs and expectations. By involving students and families, alumni, social partners, such as employers and unions, and other members of society in the planning, delivery and evaluation of education, institutions are better able to identify what is relevant to their beneficiaries and tailor their activities accordingly.

Apart from engaging stakeholders, HEIs need to understand the local, regional and international contexts in which they operate, capitalise on their opportunities, and find ways to mitigate their challenges. In times of rising accountability, institutions have the responsibility to justify to those they serve that they are loyal to their missions, use financial resources responsibly and efficiently, and organise their work in a way that meets priorities and delivers good results (Trow, 1996).

Lastly, institutions need to understand what types of policy levers are applied in their national contexts and across other systems of higher education, learn how these different levers can be implemented in an

efficient way, and use this information to devise strategies that can lead to more relevant education, research and engagement, capable of producing better outcomes for individuals and society.

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CHAPTER 5 – TRENDS, CHALLENGES AND PROMISING APPROACHES IN THE RELATIONSHIP BETWEEN HIGHER EDUCATION AND THE EMPLOYER COMMUNITY

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Todd Davey

Partnerships, skills and innovation

Higher education's role continues to evolve in many of the countries where IMHE members are located. For many centuries, higher education institutions (HEIs) primarily focused their activities on cultural conservation, and on the preservation and transmission of existing knowledge (Etzkowitz et al., 1998). But at the same time, higher education has shown itself capable of adapting to external pressures (Breznitz and Feldman, 2012; Etzkowitz, 2001). Most notably, research was added as a second mission of higher education in the 19th century: with the advent of the industrial revolution, HEIs took on the responsibility to develop new knowledge and to help students acquire the specific advanced skills required by the new sectors of the economy. And in recent decades, HEIs have increasingly been making contributions to society through a "third mission" that requires them to actively engage with external partners, and that had led to further evolution in how they provide instruction and undertake research.

The third mission is driven by an increased recognition of the important role that HEIs can play in regional development (Guerrero et al., 2015), and by a growing need for them to demonstrate the benefits of public investments in higher education. HEIs are increasingly seen as poles of innovation, and as important players in knowledge societies (Lubango and Pouris, 2007), who can provide the tools to tackle key problems faced by advanced economies, such as low levels of business innovation and high rates of unemployment. They are also increasingly expected to contribute to long-term job creation, and to stimulate economic growth (Guerrero et al., 2015).

This chapter focuses on HEIs' evolving engagement with external partners, and in particular with employers. It explores recent developments and persistent challenges in the relationship between higher education and the employer community. Additionally, it provides concrete advice for HEIs, employers and policymakers that can help ensure that effective engagement supports the development of the skills and knowledge required for success in modern economies.

Emerging skills challenges and skills concerns

In the face of ongoing economic change – including the rapid growth of digital technologies, globalisation, and reduced public funding for education (Ernst and Young, 2012) – HEIs are being called on to better attune themselves to the knowledge and skills needs of students, and to better meet the needs of the employers for whom graduates will work. Unprecedented technological change has led to drastically reduced product life cycles, faster innovation cycles and fierce competition. Firms and economies need to constantly innovate if they are to remain competitive. At the same time, as many lower-skilled and routine jobs move to lower-wage countries, OECD countries face the challenge of increasing employment in skills-intensive sectors: knowledge-intensive human capital has become a key differentiating factor.

However, for advanced economies to seize on their competitive advantage, they need workers who have knowledge and skills that are well-matched to emerging labour market needs. This is not always the case. For instance, one quarter of all workers in OECD countries have less than the level of skills required for their jobs (OECD, 2015a). Meanwhile, chief executive officers (CEOs) around the world cite the unavailability of key skills as one of the top five threats to their businesses. Three quarters of CEOs

identify a skilled, educated and adaptable workforce as a priority –and it is a top priority for policymakers as well (PricewaterhouseCoopers, 2016).

Firms, and the workers employed by them, face two main challenges. The first of these is the difficulty that employers sometimes experience in identifying new employees who have the skills that they need. Consistently high youth unemployment rates in many OECD countries are themselves partly reflective of skills gaps: the knowledge and skills of graduates are not always in line with what the labour market requires, and there is a particular shortage of certain skills such as those related to entrepreneurship (Herrmann, 2008).

The need to frequently update or enhance the skills of the existing labour is the second challenge that firms and their employees face (International Labour Organisation, 2011). Roughly five out of every six companies in the United States indicate that they face at least one of these two skills challenges (ASTD, 2014). Continuous workplace training and lifelong learning enable workers and enterprises to adapt to an increasingly rapid pace of change (International Labour Organisation, 2011). Conversely, persistent skills gaps lower productivity and hinder product development – and this leads in turn to lower profits, reduced competitiveness, increased expenses, missed opportunities and lower growth (UKCES, 2016).

Systematic cooperation between employers and HEIs, fostered by support from policymakers, is critical if countries are to address skills gaps and ensure that their human capital is well-matched to evolving labour market needs (European Commission, 2009).

Higher education institutions' response: moving from a static to a dynamic approach

HEIs can use information from the labour market, and from graduates and employers themselves, to better align students' skills with the needs of employers. Traditionally, curricula have been informed by generic secondary labour market data that (where available) are typically collected by government agencies. For instance, wage or employment data can help identify the skills that are present and those that are needed in the labour market. However, these forms of data may provide too superficial a view of labour markets, and may be poorly matched to the needs of HEIs. One problem with them is that they tend to be backward-looking: analysis of historical patterns may not yield reliable findings in times of increasing global uncertainty (IFUPRI, 2011).

HEIs – acting individually or as a system – can also undertake their own primary surveys of businesses, students and graduates. These can, for instance, generate data on graduates' satisfaction with their programmes, or employers' satisfaction with the knowledge and skills of graduates. However, it can be costly and difficult to contact employers and graduates in ways that generate reliable information. Good analysis requires continuous updating and longitudinal measurements, as well as access to a broad range of employers (with access to small- and medium-sized enterprises being especially challenging).

Data from the labour market and from surveys may need to be combined with other tools if HEIs are to get a sense of emerging skills needs. They may also call, for instance, on Delphi studies (a forecasting method that relies on experts' opinion) to predict future skills requirements and outline what these mean for an institution's mix of programmes. Scenario-based predictions, which are frequently used in business settings to predict market changes, may also be used to help forecast labour market needs. Nonetheless, predictions about future jobs have often proven to be misleading (IFUPRI, 2011) so HEIs need to act on these with caution.

However, one way to get around many of the limitations of labour market data and surveys is to systematically include employers in the higher education process itself[1]. With this more dynamic and real-time approach, HEIs work to ensure students' contact and cooperation with business during their studies (Helmstädter, 2007; Storm, 2008; Razvan and Dainora, 2009). This can take a number of forms, for instance complementing theoretical understanding with real-life practical experiences (Gillis and

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[1] The focus of this chapter is on employers. But HEI engagement of course also needs to include, for instance, trade unions and a wide variety of civil society stakeholders.

McNally, 2010), or directly involving employers in developing and modernising the curricula (Plewa, Galan-Muros and Davey, 2015). These increasingly widespread initiatives enrich education and improve students' employability (Bozeman and Boardman, 2013; Van der Sijde, 2012; Dutrénit et al., 2010), and foster economic stability and growth (David and Metcalfe, 2007). The next section of this chapter looks in more detail at some of the most common collaborative activities.

Although partnerships between HEIs and employers are an effective way to support the exchange and transfer information and knowledge (Healy et al., 2014), they are not without their difficulties. Academics are typically most comfortable with a scientific logic, whereas higher education employer partnerships expose them to a market logic (Murray, 2010). Substantial cultural and organisational differences between higher education and business can lead to confusion, resistance and even resentment. The two partners have different languages, different time horizons, different objectives and different expectations, all of which can further hinder their engagement (Galán-Muros and Plewa, 2016). Thus, while some HEIs have effectively embraced partnerships with employers (Box 5.1), other HEIs and their staff are less sanguine about the "third mission", and worry, for instance, about how to balance employer partnerships with academic freedom.

Box 5.1: The regional embeddedness of Linköping University

Linköping University (Sweden) leads an HEI-driven regional innovation system. The University's *Innovation Centre* (and its five business developers who manage regional stakeholders) works with the *Regional Development Agency* to coordinate economic development. Together, these two partners are building and implementing a regional development programme, an innovation strategy and a smart specialisation strategy.

The Linköping campus provides a "neutral territory" for regional actors to come together, and thus acts as a hub for knowledge-based development. It accomplishes this by, for instance, providing meeting places and "cohabitation" spaces and by acting as a source of innovation and ideas, new ventures, human resources, and business improvement. In addition, the University offers advice to regional businesses, and strives to maintain a strong connection with its alumni in the region.

Collaboration is underpinned by a recognition on the part of all regional actors that HEIs can play an important role in regional development; by a commitment of resources, time and energy; and by a belief that all actors can have synergetic relationships as both knowledge producers and users. Collaboration is further supported by ongoing public funding for education, research and regional initiatives. This allows for a longer-term perspective, helps build a more stable environment, and ensures that there is time to develop mutual respect and trust.

The University's strategic relationship with Saab provides a good example of how effective HEI-employer relationships can work. The boards of the two organisations have joint meetings, and coordinators in each organisation manage cooperation and provide expert advice at multiple management levels to the other partner organisation. Some *Saab* managers also work as adjunct professors (20% of their time is spent at the University): they are present on University boards, teach, supervise theses, and mentor researchers and students. "Industrial PhDs" (who spend half of their time in Saab's workplace and half in the university department), collaborative projects and co-publications are further avenues of cooperation. Furthermore, Saab invests SEK 6.8 billion annually in R&D, and a significant portion of that ends up with Linköping University. The large number of students who are involved in r projects, internships or doctorate at Saab are more attractive in the job market.

The University and its students derive substantial benefits from regional cooperation. For instance, 20% of Linköping staff own their own company, and 95% of students find a job in their chosen field one year after graduation. Meanwhile, employers like Saab not only gain new knowledge and human capital from their cooperation with the University, but also become a more engaging place to work – and so in turn improve their staff recruitment and retention.

The benefits of higher education-employer cooperation

Collaboration between HEIs and employers can have a wide variety of benefits. At the institutional level, these relationships support the development and delivery of curricula (Shahabudin, 2006); provide students with a more labour market relevant education (Kruss et al., 2011; Carayol, 2003); and can over time increase an HEI's reputation (Ahrweiler, Pyka, and Gilbert, 2011). They can also provide a way to access industrial knowledge and infrastructure (Arvanitis, Kubli, and Woerter, 2008), and represent a potential stream of funding (Santoro and Chakrabarti, 2002).

Employer involvement in education enriches students' learning (Gibb and Hannon, 2006; Razvan and Dainora, 2009; Storm, 2008). It provides practical experience (Dutrénit, De Fuentes, and Torres, 2010; Van der Sijde, 2012) and helps build professional networks (Bozeman and Boardman, 2013). As a result, students' skills are better aligned with the labour market needs (Gunasekara, 2006; Ssebuwufu, Ludwick, and Beland, 2012), and this in turn enhances graduate employability (Bozeman and Boardman, 2013; Drucker and Goldstein, 2007).

By engaging with HEIs, employers can improve their competitiveness in knowledge-intensive labour markets and raise their brand profile (Healy et al. 2014). And as they work to shape skills development and provide employment opportunities, employers exchange knowledge and build relationships with students. This, in turn, promotes better access to qualified graduates (Ginzburg and Houli, 2013; Baadsgaard, 2012), who bring key problem-solving capabilities to the workplace (Lee, 2011; Debackere and Veugelers, 2005). It also allows employers to identify, recruit and integrate graduates who fit their needs (GCRI, 2013), which in turn lowers hiring and training costs (Strunz, Yokoyama, and Palma-Behnke, 2003; Shahabudin, 2006).

But despite these various benefits for HEIs, students and employers alike, the measurement of results of partnerships can be challenging. The task is complex due to the multiplicity of stakeholders involved (Healy et al., 2014); the tacit nature of knowledge flows between stakeholders (Liyanage et al., 2009); multiple intangible aspects such as reputation or employability (Perkmann, Neely and Walsh, 2011); the informality of many relationships between HEIs and employers (Ssebuwufu et al., 2012); and the fact that results may only appear over the longer-term (Perkmann et al., 2013).

In the face of these challenges, HEI managers, governments and international organisations are actively seeking tools and indicators to better measure the results of engagement. For instance, the European Commission has moved to measure results through scorecards that follow an 'input-activity-output-outcome-impact' structure (Healy et al., 2014). Although this approach has been replicated in the United Kingdom, Netherlands and Sweden, there is still no structured and generally accepted system of indicators that measure HEI-employer engagement. The OECD's benchmarking higher education system performance project will attempt to address this by measuring and assessing engagement with the wider world along with the other two key functions of higher education systems. The benchmarking project will use international and national indicators and qualitative information to measure system performance.

HEI managers and policymakers alike face the challenge of developing a set of qualitative and quantitative indicators that can take into account the wide range of relationships and results (e.g., tangible, intangible, direct, indirect, short-term, long-term, etc.) as accurately and comprehensively as possible (Breznitz and Feldman, 2012). Difficulties in comparing indicators across HEIs and across countries raise a further challenge.

Forms of HEI-employer partnership that build students' knowledge and skills

This section explores the most common forms of HEI-employer partnership that can help align higher education design and delivery with labour market needs, and ensure that graduates are highly employable.

Joint curriculum design and delivery

HEIs often invite employers to contribute to the design of the curriculum and to its delivery. Such partnerships first emerged during the 1800s. For instance, in the United States, land-grant universities engaged in "cooperative" and "industrial-extension" programming, which promoted a more practice-informed curriculum and supported the development of human capital that was aligned with the needs of industry (Rosenberg and Nelson, 1994).

Employer participation in curricular design can be focused on specific courses, or on entire programmes, at either the undergraduate or postgraduate level. It might be related to course or programme content, or more holistically to course or programme methodology and organisation. In the past, interactions between employers and HEIs have typically occurred via personal relationships and followed informal channels, instead of being centrally managed and controlled. But more recently, HEIs have responded to increasing pressures for skills that are aligned with employers' needs by creating institutional mechanisms for the systematic and periodic consultation of employers. For example, employers are sometimes involved in the governance of degree programmes.

Employers also partner in the delivery of the curriculum, i.e. the delivery of programmes, courses and content to students via lectures, placements, live projects and a variety of other mechanisms (Plewa, Galan-Muros and Davey, 2015). Guest lectures from industry are one common approach: in a large European survey, 67% of the European academics who were engaged with businesses reported having had a business guest lecturer in one of their courses in the preceding 12 months. But individual lectures require low commitment, and may have limited impact. At the other end of the scale, employees of firms will sometimes hold a formal instructional position at an HEI (e.g. an adjunct, honorary or part-time professorship). Such arrangements are found at 48% of European HEIs (Davey et al., 2011).

By participating in the design and delivery of curricula, employers can influence the education of prospective employees (Plewa, Galan-Muros and Davey, 2015), and help ensure that graduates emerge with the knowledge and skills required in the workplace (Sebuwufu et al., 2012). Students are exposed to practical problems, enhance their pathways to employment, and become better prepared for future jobs (European Commission, 2009). And by engaging with employers in curriculum design and delivery, HEIs gain access to supervisors who can participate in student placements, as well as support for programme development and the evaluation of new courses. This reduces the academic training costs faced by HEIs (Shahabudin, 2006) and helps them align their programmes with local or regional demand for specific, new or updated skill-sets (European Commission, 2009).

In spite of the potential benefits of employer participation in curriculum design and delivery, there is still some debate about just how desirable this practice is (Barnett, 2002; Gillis and McNally, 2010). There are concerns, for instance, that employer involvement may limit academic freedom because employers may influence the material taught, leading academics to teach specific topics and approaches that may not be to their preference. And there are also concerns that employers will manipulate learning for their own benefit (Barnett, 2002), pushing their individual immediate needs instead of the longer-term needs of the whole sector. Engagement often leads to increased workload for both staff at HEIs (Chatterton and Goddard, 2000) and employers, which create further challenges.

Box 5.2: Cooperative curriculum development and delivery by the Management Centre Innsbruck

The Management Centre Innsbruck (MCI) in Austria strategically engages with employers to improve teaching and learning, and enhance student employability.

At MCI, curricula are designed in consultation with a "development team" to ensure that they meet not just formal accreditation requirements, but also the needs of the labour market. For example, in the case of the Medical Engineering programme, MCI involves professionals from hospitals, the IT sector and medical engineering companies in course design and delivery. These industry stakeholders are also systematically included in the student admission process: they provide for instance input into the entry exams, help assess student CVs, and participate in personal interviews. Their knowledge about what businesses are seeking in graduates enables them to strengthen the admission process. The involvement of industry stakeholders also helps MCI programmes build networks and ensure their own legitimacy and credibility in the business world.

Even though it is a small institution (with about 3,000 students), MCI employs around 1,000 lecturers. Half of the teaching load is covered by full time faculty, but the other half is covered by approximately 900 external lecturers (who come mostly from business or from other HEIs). External lecturers have the opportunity to scout for potential employees and make some "high-potential" hires. MCI strategically chooses its part-time lecturers with this unofficial role in mind.

Student placements

Student placements temporarily integrate students into a workplace. They can be either part-time or full-time in nature, typically generate academic credit, and usually include some form of two-sided supervision (i.e. by both academic staff and employers). Student placements are sometimes also organised as extra-curricular activities (Hynie et al., 2011).

There are no comprehensive data on how many students participate in student placements. In the United States, it was estimated that perhaps one third of college students undertook summer internships in the 1990s, with half of these unpaid (Gregory, 1998). Other estimates suggest that in Europe, between 22% (in Italy) and 100% of students (in Turkey) engage in work placements or internships during their HE studies (Allen and van der Velden, 2009).

What is clear, though, is that HEIs are confronting expectations on the part of students and parents that graduates will be able to find a good job – and work placements are one response to these expectations. HEIs also face pressures from policymakers to reduce graduate unemployment: student employability has become a priority in policy circles, and rankings have emerged on this topic (e.g., the Global Employability University ranking). For their part, employers are also putting a good deal of emphasis on work placements; up to 85% of employers in the United States, for instance, offer students some payment. They either prefer or will only hire a graduate with prior experience (Gault et al., 2010).

Career offices (also called career services) are mostly responsible for managing work placements at HEIs. As part of the process, they identify a supervisor within the HEI and another in the workplace; supervisors help ensure that students acquire appropriate practical skills, increase their knowledge, and gain good work experience. Some of the most common activities that facilitate student placements include HEI career fairs (focused on a specific sector, or more general in nature), where recruiters and students can meet to exchange information about placement opportunities and about students' aptitudes; individual presentations, in which employers inform students about their businesses and opportunities available; forums where several professionals from a given sector make short presentations, followed by questions and networking; 'recruiter in residence' or 'graduate recruiters' sessions that give students a chance to talk about the opportunities available with employers; and mock interviews with employers to practice interview techniques with someone trained in a specific sector.

Many HEIs also make use of their alumni (e.g., Harvard University's Office of Career Services' "Firsthand Advisers") to provide students with networking, job-shadowing and mentoring services. These

interactions can occur either face-to-face or through online platforms (e.g., "Handshake'' at Stanford University), and they may even facilitate international placements such as those funded by the Erasmus Internships in Europe.

Growth in the number of student placements has led to an expansion and professionalisation of career offices. For instance, at many HEIs, career coaches with industry experience are now providing students with personalised and comprehensive services. These coaches work with students to explore career paths and facilitate access to customised employer networks and this, in turn, helps diversify internship and employment opportunities. Although HEIs sometimes partner with an external company to connect students and employers, it is more usual for coaches to build long-term partnerships directly with employers from diverse sectors.

Placements assist students in gaining research and professional skills (Hynie et al., 2011) as well as real work experience. They can also help students identify a personal mentor, and provide networking opportunities (Gregory, 1998) that lead to career-oriented employment (Callanan and Benzing, 2004) and enhance employability more generally (Bozeman and Boardman, 2013). Placements may help students foster ongoing relationships with employers (Hynie et al., 2011) and even enable them to be hired by the company where they had their placement. For example, this happens in nearly a quarter of placements in the United States, according to the National Association of Colleges and Employers (ACCU, 2013). At the same time, placements provide employers with access to talented students who bring problem-solving capacities that can stimulate innovation (Lee, 2011). Employers also benefit from reduced hiring costs (placements provide a means to screen potential employees), and gain access to lower-cost workers (Gregory, 1998).

Despite recent developments in student placements, several challenges remain. For instance, it can be difficult to create and sustain HEI-employer partnerships in the longer-term (Henderson et al., 2007). This is particularly the case when staff rotation is high. It can also be a challenge to ensure that career offices are connected and coordinated with other HEI units that have a relationship with industry (e.g., innovation offices, incubators, technology transfer offices, etc.) and therefore build effective collaborations. Quality assurance can also pose difficulties: HEIs need to find effective mechanisms to measure and ensure the quality of placements and make certain that students acquire relevant skills. Finally, HEIs and employers sometimes face concerns about the working conditions of placements: there is potential that poorly designed and supervised placements may exploit the labour of interns and provide them little in return.

Box 5.3: Support for student employment at Northeastern University

Northeastern University in Boston is a leader in experiential education and student placements. Northeastern puts an emphasis on educational programmes that link coursework with a variety of practical experiences, using a learning model that integrates academic and employment experience.

For over a century, Northeastern has been offering "co-op" experiential learning programmes through which students gain up to 18 months of full-time work experience before graduation. Students have two or three six-month internships with one of more than 600 companies (e.g., Ernst and Young, General Electric, Staples or PricewaterhouseCoopers). Over the course of their internship, students implement a customised project plan designed with their employer to address a key business need. Graduates of the Northeastern programme not only gain valuable experience in the job market, but also access to professional networks.

Other initiatives at Northeastern to support student employability include large career fairs held twice a year; on-campus recruiting; an employer-in-residence; nuCAUSE ("Creating Awareness and Understanding of Social Engagement Careers"), which is a career development initiative designed to help students learn about careers that effect social change; Husky Treks, which allows students to explore their career options through a behind-the-scenes tour of some of Boston's top companies; and Career Express, a programme which provides 30 minutes of advice per week for quick questions and immediate needs.

Northeastern has several centres and student organisations that work together to offer support for internships, networking, preparation of resumes and cover letters, career guidance, interview skills and job searches. Services include career conversations with alumni panels; career guides; workshops; a speaker series; and online support tools available through NUcareers.

Since 2011, Northeastern has been rated by Bloomberg Businessweek as the top undergraduate business programme for internships in the United States. It is also number one in the Global Career Services Satisfaction Award at the 2016 Future Talent Summit. For the past several years, its career services have been ranked either number one or two nationally by The Princeton Review, and it placed fourth for top internship opportunities in 2016.

Dual education

Dual study education combines apprenticeships in a company with vocational education at an HEI, and thus has a considerably greater focus on the practical relevance of skills than typical degree programmes. Typically, dual-study students spend extended periods of time in both an academic and an employer setting. This gives them the chance to pursue a degree programme at a university or university of applied sciences while simultaneously earning a certification of practical vocational training or work experience in a company.

Dual-study programmes are built on effective linkages between education, research, and employers. This means that they require stable long-term cooperation between HEIs and employers to ensure that the academic curriculum is closely connected to the job that students hold, and that all academic standards are met. The two partners also need to negotiate how they will award students a double qualification that corresponds to the two integral parts of the programme, i.e. a higher education qualification combined with a certification of practical training or work experience.

Dual study is most fully developed in the higher education systems of German-speaking countries – and in particular of Germany. In 2015, there were 64,358 dual study places available in Germany, offered by 1,461 different programmes (BIBB, 2016). These programmes are primarily found at universities of applied sciences and universities of cooperative education, but also are available at more traditional universities. Over 70% of the companies involved in dual study are small and medium-sized enterprises (SMEs), but the number of large organisations that participate is on the rise (BIBB, 2016).

Like work placements, dual-study programmes enable students to combine pursuit of academic qualifications with work experience. But the potential to receive a dual qualification sets them apart, as does the opportunity they provide to receive a training allowance and to more fully connect with potential future employers (ACATECH, 2014). For companies, dual education represents a way to recruit highly qualified employees, to build a high level of commitment and company loyalty, and to prepare potential employees for their later work at the company (Graf et al., 2014).

Dual study has traditionally been an employer-driven initiative. However, given the success that these programmes have had in German-speaking countries in stimulating employment pathways (Box 4), governments in other countries are increasingly promoting dual studies. Success requires commitment on the part of employers, and willingness on the part of HEIs to provide the necessary academic oversight.

Despite dual study's advantages, there are still challenges facing these programmes. Transparency about the study requirements and format of a specific dual study programme may, for instance, be limited: because each programme is negotiated individually, there is limited government oversight and there are few common standards. Moreover, each partner will have a different set of needs, which makes negotiation a time-consuming process: the expectations of the HEI and employer may sometimes be misaligned. Finally, differences in the structure of dual programmes both with and across countries mean that programmes can be difficult to compare, assess and accredit.

Box 5.4: Dual study at Volkswagen Group

The intensive dual study programmes at Volkswagen Group (VW) combine higher education coursework with the chance to gain a qualification in a recognised occupation. They mix focused periods of work with periods of focused study that culminate in a Bachelor's thesis. The standard programme lasts eight semesters. It offers a strong practical focus, allows students to earn a monthly stipend while they learn (Ausbildungsvergutung), and ultimately can lead to a job at VW.

Dual study programmes can be undertaken in any of the six VW locations in Germany. Areas of specialisation include business studies, electrical engineering, body structure development, automotive information technology, information technology, mechanical engineering, sales management, mechatronics, materials sciences, logistics, industrial engineering, and economics.

Student projects with businesses

Projects with businesses offer students another way to gain practical experience as part of their studies (Boersma et al., 2008). Under this approach, students perform a project for an employer as part of their academic course or programme. Their grade depends in part or in full on this project.

Over the course of a project, individual students or groups of students typically work as consultants to address a specific problem faced by an employer. This work takes place over a specific period of time (e.g. one semester) and may be provided to the company either at no cost or in return for some fee paid to the HEI. Academic staff are generally required to participate in the design of the project. As a result, by the end of a project, both students and their academic supervisors will have developed relationships with the employer.

Wageningen University in the Netherlands provides a good example of the project-based approach. At Wageningen, Master of Science students provide consultancy services to enterprises, governmental and non-governmental organisations to address 'real-life' problems in areas such as the social sciences, environmental sciences, life sciences, and technology and food. Students are organised into teams of five to seven, and provide between 1,100 and 1,500 hours of services per project. The hiring organisation covers any material costs (e.g., laboratory equipment, field trips, software, database access, etc.) and the programme includes both an employer and an academic supervisor.

This practice is now relatively common: in a recent survey, 38% of the European academics engaged with businesses reported having conducted student projects with employers in the preceding 12-month period (Davey et al., forthcoming). And platforms such as Demola (Box 5.5) are emerging to facilitate student projects. The Demola staff can select the most appropriate registered candidates (even if they are located in other countries) for a particular project, and enable transparent collaborative work online.

Like other forms of HEI-employer cooperation, student projects with businesses help students develop labour market knowledge and skills through knowledge-based employment opportunities. They enable students to apply theory in a real-life setting, provide access to practical knowledge and experience with employers, and can ease labour market transitions. Projects do require businesses to share some of their own internal information, which can cause resistance. On the positive side, however, interactions with students could help develop this information further and introduce new ideas. In addition, businesses enjoy direct access to talent. For HEIs, student projects can enhance their educational programmes, their reputation and their connections to local industry.

Student projects usually depend on several enabling factors. The first is an HEI regulatory environment that permits partnerships of this type, including accreditation systems that are flexible enough to incorporate this form of learning. Both HEIs and employers also need to be open and committed if projects are to have successful outcomes. Pre-existing relationships between academics and employers are usually a key driver behind student projects.

A significant obstacle to the project approach is resistance on the part of academic staff to having the needs of business employers "thrust" upon them, and their uncertainty about how these projects actually assist student employability. A related problem is linked to the fact that these projects generate extra workload for academic staff, without this extra work necessarily being recognised by the HEI in a formal way.

Box 5.5: Demola: an innovative platform for product and service development

Demola is an innovative collaborative co-creation platform that links students, businesses and HEIs. Originally created by Tampere University of Technology, the platform now operates in 13 countries.

The basic Demola programme includes a semester long project that generates eight academic credits. Projects put multidisciplinary student teams into a collaborative and innovation-friendly virtual environment. The student teams develop, test and demonstrate novel product and service concepts that respond to employer needs.

Businesses apply to participate in Demola by proposing new concepts, and students then select a project that they find interesting. As a curriculum-bound programme, Demola offers coursework, a location, a platform and facilitators who support students as they develop new products and services. Over the course of the semester, student groups participate in ideation and brainstorming sessions; scan for competitors; analyse the market; develop a prototype; and pitch concepts to the business. Businesses then have the option of "buying back" the concept via one of three models which are agreed on before the project starts. If the business does not want to buy the concept, the students get the right to develop it for themselves.

In Finland, 96% of completed Demola projects are licensed by the project partners. Some students have created start-ups; over 10% of students are head-hunted by the companies they worked with; and all students get a taste of entrepreneurship.

Company-based doctorates

Company-based doctorates are another form of HEI-employer partnership. In these programmes, students are hired by a company while they are concurrently enrolled in a PhD programme at an HEI. Students split their time between the two organisations. They are able to both contribute to knowledge by specialising in a given field and to apply their scientific knowledge in a practical setting.

The characteristics of company-based doctorates differ across countries. In Europe, they are called industrial PhDs, but there is no European-level regulation governing them. This means, for instance, that in some European countries, industrial PhDs are regulated by law (e.g. Denmark, Sweden and France) and companies that provide them receive government subsidies. But in others, they are regulated on a case-by-case basis (e.g., Germany).

In the United Kingdom and Australia, these types of programmes are called "professional doctorates". They generally target mid-career professionals who are already in the labour market and simultaneously want to make a practical contribution to their sector. It is done in the framework of work-based learning. In the United States, "professional practice doctorates" are increasingly common. While industrial PhDs and professional doctorates are equivalent to a PhD, the American professional practice doctorate is not.

Firms benefit from company-based doctorates through greater productivity, more patent applications and eventually increased profits. Meanwhile, students develop advanced scientific and practical knowledge and skills that can lead to better salaries, higher employment rates and enhanced corporate leadership roles (Danish Agency for Science, Technology and Innovation, 2012). For HEIs, industrial PhDs build the foundations of new research and generate a better understanding of industrial practice.

Successful company-based doctorates require close long-term relationships between HEIs and employers to support the creation and management of a programme. For instance, both the HEI and the company need to assign a supervisor. If these supervisors have previous experience in the other sector (e.g. if the academic supervisor has had experience in business), they will be more likely to understand the complexities of a company-based PhD. Both partners need to be clear about the different requirements and expectations of academia and industry, including expectations surrounding information exchange during the process, intellectual property ownership, the communication of research results, and the balance of time spent on industrial vs. research projects (Kihlander et al., 2011).

Students face the challenge of achieving two kinds of objectives (academic and industrial) at the same time. This means that the scientific component of the programme (the curriculum, seminars, workshops, etc.) and the practical one (the student's responsibilities and tasks within the company) need to be well aligned with each other. A thorough selection process can help identify which candidates are most likely to be successful and most industrial PhD students are selected by the employer partner. Other challenges include the risk that companies may change their mind and lose interest in the project; that they may close their operations; and that their need of confidentiality and IP rights may go against the disclosure required for scientific purposes.

Lifelong learning

Lifelong learning can lead to HEI-employer interaction when higher education programmes respond to industry needs for employees with improved and updated skills (Davey et al., 2011). These kinds of services go by various names, including "permanent", "continuing", "professional", "extended" or "industry" education and training.

Since the inception of the "Lifelong Learning for All" initiative in 1996 (OECD Education Ministers meeting), lifelong learning has been gaining prominence in the agenda of policymakers and HEIs alike. The primary reasons for this growing interest include the ever-rising levels of skills required by employers and a more volatile employment market where skills have a shorter shelf-life.

While some professionals engage in standard adult/professional education courses on their own initiative, others ask for tailored company courses delivered by HEI staff (Rakesh and Chandra, 2007). In that latter case, HEIs and employers might co-design or co-deliver the courses (Lamichhane and Nath Sharma, 2010), thereby allowing the coursework to better respond to the specific skill and training needs of the workplace (Ssebuwufu et al., 2012). Although HEIs tend to be more focused on executive education, employees at all levels of the organisation can take lifelong learning courses.

Spending on corporate training amounts to over USD 70 billion in the U.S. and USD 130 billion worldwide (O'Leonard, 2014) and it is expected to continue to grow. But there are variations in how prevalent employee lifelong learning is. For instance, a study from the United Kingdom found that two thirds of

employers fund or arrange training for their employees, providing an average of 6.8 days per employee. However, while 96% of large companies (100+ employees) are active, only 51% of SMEs provide training for their employees (UKCES, 2016).

Lifelong learning builds skills and knowledge that, when transferred to the workplace, support more capable workers who can develop or make use of more sophisticated processes, technologies and methods of work. As a result, businesses benefit from increased organisational commitment and job satisfaction (Pate et al., 2000), which help them maintain their competitive advantage in dynamic international markets (Tresserras et al., 2005). At the same time, effective lifelong learning programmes allow HEIs to be recognised as educational leaders by employers. Moreover, lifelong learning enables individual employees to be better prepared to compete in the global economy and to better function as members of their communities.

A well-coordinated working relationship between employers and HEIs is essential for successful lifelong learning programmes. This allows the two partners to jointly identify which are the most relevant skills and knowledge required; ensure that there are sufficient resources to deliver courses; and guarantee that they can be delivered in a flexible and practical way.

However, these conditions can be difficult to meet and this explains in part why lifelong learning is still just an emerging activity at many HEIs. One challenge is that some academic staff are not necessarily interested in industry education, perhaps considering it a distraction from their research activities. Among the staff members who are interested, not all will have relevant knowledge and skills that are attractive for industry. For instance, businesses in the United Kingdom are looking for a wide range of cognitive, social, emotional and transversal skills amongst their workers (e.g. time management or complex problem-solving) but they report difficulty in finding an HEI to meet these needs. While academic staff can provide students with advanced technical professional knowledge and skills that are linked to a discipline of study, they generally have less expertise in developing transversal skills even though these latter skills might be indirectly addressed through content-related exercises, assignments or debates.

A second challenge relates to the high degree of competition in the adult education market, and the fact that HEIs are just one of the many players with a low market share. Most lifelong learning services are delivered by private providers who already have experience in delivering flexible practice-oriented courses. This can be seen for instance in the case of accounting industry bodies which provide a range of specialised postgraduate programmes (CPA, CA, CFA, etc.), as well as engineering associations and pharmacy guilds, which may also play an increasing role as certifiers and deliverers of content (Ernst and Young, 2012). Given that the market is often somewhat crowded with established players, partnerships with private providers may be one way for HEIs to develop their capacity to deliver lifelong learning services.

How higher education institutions, employers and policymakers can make partnerships work

In order to address the policy challenges that skills gaps and student employability represent, systematic approaches are required. The skills and knowledge that HEI graduates develop need to be aligned with the human capital required by employers. This calls for stronger relationships between higher education and employers. These relationships depend on a process of cultural adaptation that needs to be driven by the strong and skilled leadership on both sides of the HEI-employer partnership, and that policymakers can actively support.

The role of higher education institutions

There are several effective approaches that HEIs need to consider when they are looking to ensure that engagement with employers helps their students build labour market relevant skills.

HEIs need to align employer engagement with their mission(s)

Although most HEI leaders recognise a need to engage with businesses, they are often not clear about how the two partners might cooperate or have only a narrow view of how a partnership might work. Moreover, HEI staff may not fully recognise the educational benefits of having employers as partners. To address these challenges, HEIs need to carefully frame their objectives and how they measure "success" in education. In particular, indicators of success need to reflect student employment and skills enhancement.

One of the most common ways to foster engagement with employers is to include it as a central part of the HEI mission and vision (Friedman and Silberman, 2003; Markman et al., 2004; Polt et al., 2001). This, in turn, draws attention to positive behaviours towards employer engagement (D'Este and Patel, 2005; Grimaldi et al., 2011). Neither lifelong learning nor industry-focused education and training are directly aligned with the typical HEI mission and so they are often treated as sources of revenue, with little connection to educational programmes. However, some HEIs have developed inclusive strategies to foster interaction with employers. Using a long-term approach, these strategies institutionalise HEI-employer relationships (Bozeman, Fay, and Slade, 2013) as part of the educational offerings. In such cases, HEI management can lead institutional change.

But the challenge for HEI managers goes beyond just putting collaboration into their mission and vision: academics within the HEI have to believe that collaboration is more than just words. When managers communicate their long-term commitment to business collaboration with actions, such as incentive systems and other supporting mechanisms, academic staff perceive that it is a real part of the HEIs' mission and they are significantly more likely to actively cooperate (Davey, Rossano and van der Sijde, 2015).

Management needs to make a long-term, top-level commitment to cooperate with employers

Even when HEI leaders identify collaboration with employers as part of their HEI's mission, vision and strategy, they often fail to back up this commitment. To signal real commitment to these relationships, they will need to dedicate personnel, time and other resources (e.g., finances, support personnel, infrastructure and equipment investment) to engagement.

One key leadership step that HEIs can take is to designate a board member or vice rector position for employer engagement (Korff et al., 2014). The person occupying this position will then be responsible for developing and managing strategic partnerships. All employer engagement activities at HEIs are at least implicitly linked to each other: one activity, once undertaken, can lower the barriers to others (D' Este and Patel, 2007; Bruneel, D'Este, and Salter, 2010) or stand in their way. This means that a coordinator at the highest level can help guarantee that the HEI seizes on synergies and economies of scale in its employer engagement activities.

HEI leaders can also foster engagement by including business people on their boards (including on faculty and advisory boards) and by encouraging the participation of academic staff on company boards (Wilson, 2012). Communication is important too: employer engagement needs to be promoted both internally and externally. This can bring wider attention to engagement opportunities (Korff et al., 2014); raise the profile of activities or events linked to engagement (Geissler et al., 2006; Siegel et al., 2003a; van der Sijde, 2012); stimulate links with employers (Lubango et al., 2007); and over time, help to shape a more collaborative culture.

But even committed managers cannot wield influence over an HEI once their period of appointment is up. As an HEI's leadership renews itself, there are risks of discontinuity that might wash away the fruits of previous efforts. Both cultural change and relationship development take a long time: the challenge facing HEIs is to manage these processes creating policies, structures and a culture that support employer engagement in the long-term.

An effective system of incentives can encourage the involvement of academic staff

Academics often understand the benefits that relationships with employers can have for students and businesses – and of course, they may also benefit from these relationships as well (Davey et al., 2011). But if they do not perceive these benefits to be sufficient, or if engagement seems to be too complicated, it is less likely that they will devote their efforts to activities that may often be time- and energy-consuming. In such cases, reward and incentive systems can increase the motivation of academic staff to engage with employers (Grimaldi et al., 2011). Incentive systems typically require the dedication of technical, social, human, or financial resources (Phan and Siegel, 2006) and HEIs often use a combination of non-monetary and monetary incentives. However, monetary incentives may play a minor role in those countries where academic staff are better paid (Lam, 2011); in such cases, non-monetary incentives such as recognition will be more important (Göktepe-Hulten and Mahagaonkar, 2009).

Few HEIs actually provide incentives for employer engagement. This is in part because staff teaching performance is itself often not rewarded, even though it is frequently measured in student surveys. A powerful incentive, then, may be to include employer engagement as a criterion in the academic staff members' performance evaluation, e.g., for promotion or tenure (Davey et al., 2011; Polt et al., 2001; Siegel et al., 2007, Tornatzky et al., 2002). Other incentives might include the reduction of teaching time for staff members that are active in engagement, and internal and external recognition, e.g. awards or special events (Tornatzky et al., 2002) for "engagement champions". To be effective, such incentives need to be customised to an HEI's specific context, and their value needs to be clearly communicated. They also need to be consistent with other incentive systems in operation at the institutions (e.g. incentives for grant acquisition, applied research, publishing, etc.).

Measures that support engagement need to be well aligned

Beyond providing incentives to academic staff, HEIs can also institutionalise employer engagement through other institutional actions. The challenge is to efficiently prioritise the limited resources that are available for different actions and this, in turn, calls for an understanding of the resources that each action requires, its alignment with the HEI's mission, and the returns that can be expected from it.

The actions that support collaboration with employers will often focus on institutional structures, e.g. the creation or improvement of offices or units responsible for different activities (a continuous education office, a career office, etc.). Even though such units may have different roles, their combined impact depends on their being united under a common objective or vision (Rasmussen et al., 2006; Department for Business Innovation and Skills, 2014). However, HEI offices often operate in silos: efforts by one office might be negatively affected by those of others.

Despite the potential of productive HEI-employer relationships to support skills development, the management of HEIs tends to focus on collaboration in the area of research and technology. For instance, most HEIs have an individual or office responsible for technology transfer or research collaboration, but they often dedicate fewer resources or personnel to support cooperation in education. It is important to get the balance right and to ensure that one kind of engagement activity does not detract from another.

HEIs commonly engage intermediaries to lead the units and offices that support engagement. The most effective intermediaries are those whose knowledge and experience in both academia and business allows them to understand and communicate with both partners in the relationship (Dietz and Bozeman, 2005). Effective intermediaries have business networks and speak the languages of both sectors (Perkmann et al., 2013; Haeussler and Colyvas, 2011). The "cross-cultural" skills of intermediaries are often a critical factor in the success of the HEI-employer relationship and these skills need to be updated over time.

Finally, given that bureaucracy can be a major barrier to HEI-employer cooperation (Galán-Muros and Plewa, 2016), a key step that HEIs can take is to simplify their processes for engagement and introduce flexibility into traditionally rigid structures. This can be done by making policies and processes simpler and rapidly adaptable to changes, such as incorporating external advice and lecturers.

Management of HEI-employer relationships need to be focused on people

The relationships between HEIs and employers are at their core a "people's game" where win-win outcomes underpin the interest that each actor has in the cooperation (Davey et al., 2011). The success of these relationships is based on mutual respect, trust, commitment, fluent communication and shared goals (Barnes, Pashby, and Gibbons, 2002; McNichols, 2010; Plewa, Quester, and Baaken, 2005). As a result, managers and policymakers should pay attention to the importance of human behaviour and knowledge exchange in HEI-employer interactions.

Since academic staff and business people rarely have the networks, time and opportunities to build long-term partnerships with each other (Hall, Link, and Scott, 2001; Mitton et al., 2007), HEI managers and intermediaries have a role to play in creating environments in which respectful and understanding relationships can develop. A key success factor in creating these relationships is to ensure that expectations on both sides are managed, and commitment is established from the start. This requires an understanding of the cultural and organisational differences of the two partners, including of their differing motivations, time-horizons and languages. HEI managers organise networking events where students and academic staff can meet with employers and often access pre-existing relationships with students and alumni to build employer relationships.

The role of employers

Similarly, there are a number of key considerations for employers who are seeking to build or reinforce their engagement with HEIs. Once again, strong leadership is a critical factor of success.

Employers need to take responsibility for skills development

The development and maintenance of a skilled workforce is a shared responsibility of HEIs, employers, and other partners: success relies on their combined efforts. This has several implications for employers. One of these is the need to supervise students in work-integrated learning experiences, paying attention to quality of these experiences and ensuring that students develop the skills needed for labour market success. Another is the need to actively participate in the design and delivery of higher education programmes so that students develop relevant skills and experience a smoother transition from education into the labour market (OECD, 2015b).

Employers cannot reasonably expect higher education students to be fully trained for their particular workplace when they graduate from their educational programmes. They thus have an additional responsibility to provide graduates with the training that responds to specific company needs and processes. And in the case of current employees, it is important that employers support updates and upgrade of skills even though this can be financially and logistically demanding, especially for SMEs. Finally, employers need to support governments informing them of the level of satisfaction with existing employees as well as their future employee needs, to enable more robust and reliable decision making.

All these responsibilities involve costs that individual employers need to bear, and that other employers may benefit from without themselves having contributed. The problem of collective action is a thorny one: some employers may be happy to benefit from the training efforts of others. But that is not a recipe for the collective success of a sector or of an economy.

In practice, employers may be more likely to take up these responsibilities if certain incentives are provided to recognise the public benefits of private action. These can be financial incentives such as tax credits, which might for instance subsidise a company that provides work-based experiences to students or training to their own employees. And they might also be non-financial, e.g., access to talent.

More generally, employers need to take a long-term and collective approach in which they put aside their individual short-term needs and contribute to a skilled national workforce as a greater public good. This is more likely achieved when employers are represented by associations. Admittedly, a company that is operating in a competitive market and requires short-term benefits to survive, may find this logic difficult to implement. And for other firms, some elements of business logic, such as the need for confidentiality

or the need to protect intellectual property rights, might make it more difficult to open their organisation to students and to share knowledge with HEIs.

Employers need to make a high-level commitment to partnerships with higher education institutions

Business leaders consider closer relations between HEIs and employers to be a top priority (OECD, 2013). But just like leaders in higher education, if business leaders are to achieve these closer relations, they need a strategy and they need to make commitments: they need clear objectives and a clear strategy for dealing with HEIs, and they need to commit to the effort that partnerships require. Success also entails efforts to understand and respect the different cultures of HEIs, and to clearly identify what HEIs might contribute to the education and training of current and prospective employees.

A senior person who understands HEIs is a valuable asset within a firm: she might, for instance, help identify ways to ensure that HEIs and their staff derive benefits from a partnership, and thus pave the way for better cooperation. It is also helpful for companies to systematically develop their "absorption capacity" vis-à-vis HEIs so that the benefits that partnerships bring are more tangible. This involves a capacity to identify, assimilate, transform, and apply valuable knowledge gained from interactions with HEIs, their students and their staff. Many companies, and indeed most SMEs, lack good capacity for absorption. The different speed at which firms and HEIs operate, and the different cultures in which they are steeped, can make absorption even more challenging for employers.

The role of governments and public policy

Finally, governments have an important part to play in enabling partnerships between HEIs and employers. Policymakers need to both remove obstacles to these partnerships, and help ensure that drivers of success are in place. This requires them to act in deliberate ways that take into account both the diversity within higher education and the employer community, and the diversity within the policy space itself.

Policy as a response to obstacles to partnerships

Even though policymakers typically have limited influence over the decisions of HEIs, they can nonetheless shape their behaviour through policy levers and through persuasion. Governments at all levels design policies that seek to foster relationships between HEIs and employers in order to generate social returns. For example, Swedish, Finnish and British policymakers have all recently put in place funding and incentives to encourage HEIs to develop more employable students. These policies may, for instance, seek to link educational programmes to the needs of current and future employees, and might specifically target areas that are a country's priorities.

Some governments use regulation to ensure partnerships, enhancing their importance in the national agendas and ensuring greater standardisation. In the Czech Republic, for instance, HEI-employer relationships make up part of the Strategic Plan for Higher Education Institutions (2016-2020), which indicates that external stakeholders need to be included in the design of curricula, e.g. through HEI consultations with employers (Priority Goal 4). Similarly, Ireland's National Skills Strategy 2025 includes a common approach on skills at all education levels, prioritising and standardising its regulation beyond HEIs and employer relations.

Governments also gather and distribute information to facilitate HEI-employer relationships. This approach might take the form of employer surveys on skills and training (e.g., the Skills and Training Employer Survey by the Victorian Government in Australia or the Employer Skills Survey by the United Kingdom Commission for Employment and Skills) or expert reviews that include the theme of engagement (e.g. the "Lambert Report" (2003), the "Wilson Review" (2012), and the annual 'Innovation Report' in the United Kingdom, which highlight good practices and key success factors). Information can be difficult to access for individual HEIs and employers: it is most effectively gathered and published by governments given the economies of scale that they enjoy. Reliable information enables HEIs, employers and governments to take evidence-based decisions that support partnerships around skills.

Governments also use funding instruments to foster engagement. Funding can be effective for instance when private investment is risky, when benefits of investment are only realised in the long-term, or when they are indirect. Financial incentives for employers to hire and train students are an example of this approach, such as the European Industrial Doctorate programme of the European Commission. Funding can also support the early stages of a relationship-building process, supporting initiatives that give a spark to collaboration, build trust, and pave the way towards sustainable partnerships.

Some examples of the role played by public funding include financing for:

- collaborative training of graduate students (e.g. the CREATE programme of National Science and Engineering Research Council of Canada);
- placements of higher education students in companies internationally (e.g. the Erasmus+ programme in Europe);
- industrial PhDs (e.g. the Conventions Industrielles de Formation par la Recherche in France, the Innovation Fund Denmark);
- joint infrastructure (e.g. the Catapult programme in the UK); and
- postgraduate education aimed at industry employees (e.g. projects operated by the Swedish Research Council, or the Enterprise Partnership Scheme run by the Irish Research Council for Science, Engineering and Technology).

The policy process: conditions of success

The ways in which policymakers make and implement policies can play an important role in how well they support HEI-employer partnerships.

a) Stimulate the drivers of longer-term impact

That fact that governments change regularly tends to favour shorter-term policy approaches. But investment in higher education-employer relationships requires a longer-term orientation, since functional relationships can take years to develop. Good policymaking in this area requires stable, effective frameworks with a longer-term orientation that is focused on relationships built upon trust. This sort of approach is a tenet of Swedish policy to foster HEI-employer relations. For instance, VINNOVA, the Swedish National Innovation Agency, funds collaborative projects between HEIs and companies that are up to ten years in length.

Policy also often focuses on the reduction or elimination of barriers to collaboration, e.g. bureaucracy (OECD, 2007) or costs that disproportionately fall upon one actor. However, while it can be important to eliminate barriers, such an approach is not sufficient to develop good HEI-employer relationships. Drivers that, for instance, motivate academic staff to engage with businesses (e.g., promotion, recognition, awards) and develop trusted long-term relationships with industry, can play an even more important role (Galán-Muros and Plewa, 2016). But the importance of such drivers is often neglected by public policy. The challenge, then, is to design a policy mix focused not only on mechanisms to overcome barriers, but also on mechanisms that support the drivers of collaboration and provide long-term stability to partnerships.

b) Fit policy to the needs of different higher education institutions and industrial sectors

Different fields of education have different kinds of relations with employers. For instance, fields that are more applied in nature, such as technology and engineering or biomedical sciences, generally have stronger industry ties (Arvanitis et al., 2008; Boardman, 2009; Bozeman and Gaughan, 2007; Ponomariov, 2008). Similarly, the profiles of different types of HEIs align differently with the employer community. Technical universities and universities of applied sciences tend to be more engaged with employers, in part because their knowledge transfer policies are more developed (Perkmann et al., 2013; Renault, 2006). Finally, the engagement of companies with higher education differs across sectors. Companies in more technical sectors tend to collaborate more with HEIs. The size of companies is a factor too: on average, larger firms are more likely to engage with HEIs.

The challenge for policymakers is to design policies that can at least in part meet the needs of different education fields, different types of HEIs, and different industrial sectors. In practice, this requires the creation of a common framework that can be adapted to a variety of situations with specific needs. This requires understanding of the diversity of individuals and organisations that are affected by these policies and the aspects that need to be tailored to each of them. For example, in some of the funding programmes of VINNOVA in Sweden, HEIs are able to select their own set of key performance indicators according to their characteristics and objectives within a standard framework.

c) Align policies vertically and horizontally

Policy is multi-layered: policymakers at the local, regional, national and international levels might all have simultaneous and complex effects on the relationships between HEIs and employers. Since these relationships are increasingly taking place at the international level (e.g., students who have a work-integrated learning experience in a foreign company), the interaction of policies of two or more countries further increases complexity. For an HEI, it can be hard to understand the interactions and implications of various different and potentially contradictory policies. Policy coordination is challenging, but the alignment of policies across levels of government, and even among different national governments, can improve policy results (Magro, Navarro and Zabala-Iturriagagoitia, 2014).

Similarly, policymakers from different departments or ministries of a single government might design policies in the areas of science, technology, industry and education that all include some focus on HEI-employer relations. Similar horizontal overlaps are seen in the work of European Commission, which has developed several instruments and tools to foster the "modernisation" of European HEIs: this initiative involves several directorates-general (DG Education and Culture, DG Research and Innovation, DG Growth, DG Employment, etc.), each with overlapping interests and diverse perspectives. The challenge for policymakers involves working outside policy silos, to ensure that the mechanisms they introduce at a minimum do not counteract each other and that, ideally, they are mutually reinforcing. The improvement of inter-departmental communication, the creation of thematic working groups around this topic or the inclusion of a member of other departments in decision making could help this coordination.

Conclusion

Despite the commonplace notion that HEIs operate in an ivory tower, in truth, they have a long history of responding to changes in their surrounding world. The rising skills needs of employers, combined with graduates' need for good pathways into employment, have underpinned recent transformations in the educational role of HEIs. The substantial economic and social impact of misalignments between HE and employers are leading governments to seek more innovative and effective ways to connect the two sectors and are encouraging employers and HEIs themselves to deepen their engagement.

HEIs can use a variety of approaches to better align graduates' skills with employers' needs. Perhaps the most promising one, though, is a dynamic approach that involves mutually-beneficial cooperation between employers and HEIs in the education process itself. Collaboration might involve employer engagement in the curriculum design and delivery; student projects that are undertaken with industry; student placements; dual education programmes; company-based doctorates; and lifelong learning that employers help design. Engagement with employers helps HEIs develop a more relevant and attractive curriculum for students, one that better prepares them for the transition to the world of work. Employers, for their part, benefit from skilled graduates who meet the current and emerging needs of the workplace. In a knowledge-intensive economy, this leads to greater competitiveness.

However, it can be challenging to build and maintain relationships between higher education and employers. HEI managers need to align employer engagement with the mission of their institutions, and put in place a long-term commitment to engagement. This may require, for instance, incentives to encourage academic staff to engage with employers, and it presupposes that other mechanisms that support engagement are well-aligned with each other.

Employers need to take a collective responsibility for engagement with higher education: it may not be enough for only some employers to provide students with work experience, or provide HEIs with advice. And just like managers in higher education, managers in industry need to make and sustain high-level commitments to engagement.

For their part, policymakers need to take a long-term approach, and to make certain that sufficient and sustainable incentives are in place to encourage engagement. The alignment of policies, both within and across governments, can also help ensure that policy effectively supports HEI-employer engagement.

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CHAPTER 6 – HIGHER EDUCATION AND SKILLS FOR INNOVATION AND ENTREPRENEURSHIP

Andrea Detmer Latorre

Introduction

Innovation and entrepreneurship depend on people with good cognitive and socio-emotional skills. Governments, educational institutions and the private sector all recognise the need to further develop such skills – but this gives rise to a number of key questions. What, for instance, are the specific skills that support an innovative and entrepreneurial mind-set? How can higher education institutions (HEIs) and other social actors work together to develop those skills? And what approaches to governance can best support the promotion, design, implementation, and funding of initiatives that develop innovation and entrepreneurship?

Innovation and entrepreneurship are central to the global knowledge economy. But they are distinct concepts, and rely on different kinds of skillset. It remains difficult to reach clear, precise, and generally accepted definitions of the skills that enable either form of activity. But it is nonetheless possible to identify broad commonalities and synergies in the training that develops the skillsets behind both innovation and entrepreneurship.

Innovation is a key part of the agendas of a wide range of social actors: it provides a way to leverage existing global knowledge bases, and to make good use of people's ability to expand the frontiers of "know-how". This in turn leads to products, services and processes that foster social progress and economic development. Innovation is not restricted to specific sectors; rather, it is "a continuous, pervasive activity that takes place throughout the economy" (OECD, 2010). Entrepreneurship, for its part, brings innovations to the market and to society. It creates added value by helping individuals and organisations identify and act on opportunities (Ahmad and Seymour, 2008) – and so contributes to employment and growth.

Higher education plays an important role in strong, dynamic and sustainable innovation and entrepreneurial ecosystems3. Beyond fulfilling their missions of knowledge creation and exchange, HEIs are called upon to train innovative and entrepreneurial professionals. This responsibility is shared with innovators and entrepreneurs from outside higher education who serve as partners in experiential learning, provide real-world problems for students to address, and act as role models and mentors. These partnerships strengthen engagement between HEIs and their community, and enrich innovation and entrepreneurship ecosystems.1

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1 An innovation ecosystem represents: "a network of interconnected organizations, connected to a focal firm or a platform, that incorporates both production and use side participants and creates and appropriates new value through innovation" (Autio and Thomas, 2014).

An entrepreneurial ecosystem can be thought of as: "a set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organisations (e.g. firms, venture capitalists, business angels, banks), institutions (universities, public sector agencies, financial bodies) and entrepreneurial processes (e.g. the business birth rate, numbers of high growth firms, levels of 'blockbuster entrepreneurship', number of serial entrepreneurs, degree of sell- out mentality within firms and levels of entrepreneurial ambition) which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment" (Mason and Brown, 2013).

Innovation and entrepreneurial ecosystems be situated at the national, regional and local levels, including the at the HEI level. The concepts of innovation ecosystem (van der Steen and Enders, 2008) and entrepreneurial ecosystem (Mason and Brown, 2013) are increasingly emphasising the interdependencies and connectedness of different actors.

Collaboration is thus a key feature in educational approaches that develop innovation and entrepreneurship. It can take the form of partnerships between HEIs and the private, public, or third sectors, as well as cooperation within academic networks and within HEIs themselves. Interdisciplinary approaches to education for innovation and entrepreneurship also have an important place here, as do student-led initiatives that target these activities. For their part, HEI leaders face the challenge of ensuring that education for innovation and entrepreneurship responds to students' needs, and that it effectively draws on the diverse talents of internal and external stakeholders.

This chapter explores how higher education develops the skills required for innovation and entrepreneurship. It explores the kinds of skills that support innovation and entrepreneurship; looks at how governance models can foster innovation and entrepreneurship; and considers key issues surrounding implementation.

The concept of skills for innovation and entrepreneurship

It can be challenging to identify and define the skills required for innovation and entrepreneurship. This difficulty stems in part from the numerous definitions (both broad in nature, and more disciplinary-specific) of concepts such as skills, innovation, and entrepreneurship. The notion of "skills for innovation" raises two additional complications: the difficulty of measuring human capital and innovation outcomes, and the limited attention that innovation studies have paid to skills development (OECD, 2011; Toner, 2011).

The term "skill" describes a "goal-directed, well-organised behaviour that is acquired through practice and performed with economy of effort" and includes the notion of "a level of performance, in the sense of accuracy and speed" (Winterton et al., 2006). From an interdisciplinary perspective, skills can be considered productive, expandable and social in nature. They are *productive* inasmuch as their use engenders value; they are *expandable*, since training and development can enhance them; and they are *social* to the extent that they are socially determined (Green, 2011). Both cognitive skills (e.g. literacy, numeracy, and problem-solving) and socio-emotional skills (e.g. perseverance, self-esteem, and sociability) are important for economic and social outcomes. Moreover, cognitive skills can nurture socio-emotional skills, and vice versa (OECD, 2015). There is ongoing debate, though, about how to best assess socio-emotional skills, and about the stages in life during which they are the most malleable.

"Skills for innovation" can be defined as technical skills; thinking and creativity skills; and behavioural and social skills (Avvisati et al., 2013). A survey of university graduates that was carried out about a decade ago provides insight into the critical competencies that innovators possess: alertness to new opportunities; the ability to mobilise other individuals' capacities; creativity in coming up with new ideas and solutions; a willingness to question existing ideas; an ability to present products, ideas or reports; and the ability to acquire new knowledge (Avvisati et al., 2013; Vila et al., 2014). Other keys skills that innovators commonly possess include the capacity to connect seemingly unrelated ideas, and the ability to relate to people from different backgrounds.

The essential skills that favour entrepreneurship include problem solving, creativity, interpersonal skills, a capacity to take calculated risks, and the ability to plan and manage projects (European Commission, 2008; Potter, 2008). Other important skills include persistence; the ability both to lead and to be a team player; and, tolerance for failure. The significant similarities between entrepreneurial competencies and "non-cognitive factors" such as self-efficacy and social skills are worth noting (Farrington, C.A. et al., 2012).

The approaches that higher education programmes take to these skills will depend in part on their own educational orientation. Entrepreneurship skills, for instance, can be developed by "education about" (i.e. placing a focus on the theory behind entrepreneurship); by "education for" (with a focus on occupational needs); or by "education through" (with a focus on experiential entrepreneurial learning processes) (Lackéus, 2015).

"Education for" and "education through" innovation and entrepreneurship can also support the development of a democratic and inclusive society, i.e. help address education's "forgotten dimension"

of citizenship (Fryer, 2005). As Fryer notes in his discussion of the United Kingdom's Dearing National Committee of Inquiry into Higher Education, education for citizenship has received insufficient attention in policy debate and implementation. Challenges include the sheer breadth of the concept of "citizenship", and the difficulty of defining specific actions and approaches that help develop the skills related to it. However, skills for innovation and entrepreneurship – given their creative, relational and self-directional dimensions – may be able to encourage the development of active citizens.

The governance of education for innovation and entrepreneurship

The creative, dynamic, and especially the collaborative aspects of innovative and entrepreneurial activity have an important part to play in the governance and management of innovation and entrepreneurship education. Higher education's development of skills for innovation and entrepreneurship involves collaboration among numerous stakeholders with intertwined agendas. They include HEIs and academic networks, industry, governments, entrepreneurs, alumni, and the broader community. But collaborative educational models that support innovation and entrepreneurship can be challenging to govern, especially in view of stakeholders' diverse objectives.

Differing aims guide the innovation and entrepreneurship policies and initiatives that are promoted by various sectors of society. The aims of the public sector include increased business creation, competitiveness, employability, equity, and social wellbeing. The private sector's aims include greater efficiency, differentiation of products and services, and increased profit. Meanwhile, civil society focuses on better labour opportunities, greater empowerment of local communities, and personal satisfaction. Differences in these objectives lead to differences in how stakeholders engage in education for innovation and entrepreneurship, and give rise to the challenge of reconciling distinct agendas. If sustainable models of collaboration are to be developed, it is important to take account of diversity in motivations and in institutional cultures. But the fact that the objectives of different stakeholders and sectors are in general complementary – even if they are distinct – bodes well for efforts to harmonise them.

The governance structure of education for innovation and entrepreneurship (i.e. who takes what decisions) is made up of these varied social actors playing different roles; this is the case whether a governance framework explicitly exists, or whether it is merely implicit in the interactions of numerous participants. Governments for instance recognise the broad social and economic benefits of innovation and entrepreneurship, and make a contribution by promoting educational initiatives and providing policy frameworks and financial resources for skills development. It is well known, though, that the interaction of competing rationales and the fragmentation of public policy responses are key challenges for innovation policy systems: an overarching innovation policy requires policymakers to cross ministerial boundaries, and is built on policies that are mutually supportive (OECD, 2005). The governance of education for innovation and entrepreneurship faces challenges similar to those that affect the governance of innovation systems writ large.

There are, however, a number of ways in which such challenges can be met. For instance, the long-term "re-modelling" strategy of the National University of Singapore has brought together national stakeholders (including supportive policymakers) and international partners, aiming to create a "global knowledge enterprise" (Sidhu et al., 2011). And at the doctoral level, the Eindhoven University of Technology is boosting graduates' innovation skills and readiness for different employment fields – while at the same time increasing the number of students – through its Impuls collaborative initiative with industry. This initiative entails matching funds furnished by the university and its industrial partners; joint definition of specific projects; and alignment of the projects to the university's scientific and societal research priority areas. Impuls is coordinated by a team of university professionals (often with many years of experience in industry) and of researchers. It is jointly directed by the university's Valorization Center '*Innovation Lab*' and Board Staff departments.

Firms for their part contribute to entrepreneurship and innovation education by providing practical contexts for learning – including specific industrial problems to be addressed by students, and the

financial resources required to implement programmes. Entrepreneurs contribute through mentoring, specialised expertise, and initial funding. Investors often contribute by setting standards for start-ups' fund-raising. Also, the broader community supplies an essential educational resource: real (social) challenges that need to be tackled innovatively and entrepreneurially.

HEIs play multiple pivotal roles in education for innovation and entrepreneurship. They can lead innovation and entrepreneurship programmes, with responsibilities that range from defining key learning outcomes to coordinating collaborative networks. HEIs can also support innovation and entrepreneurship by effectively monitoring their programmes, and by making use of the results obtained to improve skills development. But, although it is recognised as an important practice in entrepreneurship education, long-term monitoring of graduates (focussed on their outcomes) is still not a common practice (Hofer and Potter, 2010).

Various units at HEIs may take part in innovation and entrepreneurship education. For example, universities' technology transfer offices can provide specific knowledge and guide knowledge-creation based agreements. Moreover, HEIs can also make a substantial contribution by re-thinking the place that skills for innovation and entrepreneurship occupy in their institutional strategies, budgets and curricula. The outcomes of innovation and entrepreneurship learning are improved when it is integrated across the curriculum. This sort of broad approach complements more focussed innovation and entrepreneurship programmes, and supports learning processes throughout the entire academic course.

Of course, from a financial point of view, education for innovation and entrepreneurship may have higher costs than "regular" programmes: interdisciplinary teaching teams, hands-on approaches, and smaller size classes will often require more human and technical resources. To achieve consistent and significant results in innovation and entrepreneurship education, HEIs thus need to establish clear governance models which outline responsibilities, pedagogical approaches, coordination mechanisms, and funding models.

Key issues in the practice of education for innovation and entrepreneurship

HEIs approach education for innovation and entrepreneurship in many different ways. The approaches vary according to institutional mission; institutional culture; and the nature of the internal and external forces that drive institutions (and which may be favourable to, or opposed to, innovation and entrepreneurship).

Diversity in institutional approaches has a number of different aspects. These include the relative place that innovation and entrepreneurship skills occupy within individual programmes at HEIs; the inclusion of these skills in curricular, co-curricular or extra-curricular activities; how the management level of HEIs views innovation and entrepreneurship; the disciplinary or interdisciplinary aspect of specific programmes; whether a focus on innovation and entrepreneurship is mandatory or optional; the ways in which students are involved; the pedagogies that are used; the background of lecturers and of learning facilitators; the forms that intra- and extra-institutional collaboration takes, and the intensity of such collaboration; and (perhaps most critically) the specific skills that learning and teaching develop.

But in spite of this diversity, there are a number of common issues that arise in any approach to innovation and entrepreneurship education. This section of the chapter explores four such issues, all of which may be considered to be critical for HEIs and policymakers.

The project or the person?

Active learning methods are a key element of pedagogical approaches that seek to develop skills for innovation and entrepreneurship. These hands-on methodologies support learning by enabling students to make use of their skills, and by fostering self-reliance and self-reflection (Klapper and Tegtmeier, 2010). Problem-based learning is one such methodology. In a problem-based approach, students work to solve complex real-world problems – which means that emphasis shifts away from what is *taught* to what students *learn* (Hoidn and Kärkkäinen, 2014). The undergraduate curriculum at the Franklin W. Olin

College of Engineering in the United States, which is designed to train engineering innovators, offers an example of such an approach.

Another common hands-on learning approach involves the creation and design of innovative products, services and start-ups. This frequently takes place in collaboration with external stakeholders who have their own objectives, e.g. to find solutions to industrial technical problems, or to take part in entrepreneurial networks. Cooperation *within* HEIs (extending beyond the core teaching team) is still another common hands-on approach. For example, students sometimes contribute to the efforts of researchers who are seeking to transfer the results of their research to society. In such cases, students might perform market assessments, propose business models, or even participate in eventual spin-offs.

Practical approaches like those described above can make effective contributions to innovation and entrepreneurship learning outcomes. There is a risk, though, that such approaches may focus too much on the project itself (e.g. on resolving problems, or on developing innovations or endeavours), and too little on students and their learning outcomes. From an educational perspective, it is crucial to maintain a focus on the learning process and the development of skills. Applied projects need to serve in the first instance as tools for learning, rather than simply generate solutions to the needs of partners.

The question for HEIs, then, is how to achieve a proper balance between the objectives and the results of collaborative educational initiatives that focus on innovation and entrepreneurship. It is important for HEIs to clearly define the expected outcomes of these initiatives, making a distinction (even if this may be somewhat fuzzy) between innovation and entrepreneurial *activities,* and the actual *education* of innovators and entrepreneurs. Learning may be safeguarded by ensuring that its outcomes are clearly assessed by students through self-assessments, as well as by their peers and by educators. Nonetheless, HEIs need to keep in mind the significant gaps in our knowledge about how to best assess education that is focussed on entrepreneurship (Duval-Couetil, 2013) and on skills for innovation (OECD, 2011).

Community engagement in the facilitation of learning

Practitioners (i.e. innovators and entrepreneurs) have a central part to play in education for innovation and entrepreneurship. They act as role models for students, providing them with first-hand experience, know-how, real cases, and lessons from practice. Role modelling, for instance, gives learners access to an additional, experience-based point of view that helps them understand and adopt skills. This works because the profile of innovators, and in particular of entrepreneurs, tends to differ from that of traditional academic staff. As a result, the experience that practitioners bring as "teamed trainers" complements the pedagogical tools that academic staff are themselves able to deploy.

Collaboration with other social actors (e.g. governments, community associations and companies) provides students with important access to the real problems that undergird problem-based learning. Real-life problems motivate students to identify relevant solutions that have an impact on society. Moreover, community engagement in education for innovation and entrepreneurship, if it is well designed and well managed, complements the other collaborative activities that HEIs engage in. For example, research projects that HEIs undertake with companies provide students with challenges to analyse, and the solutions that they develop can then be implemented through the partner companies. And collaborative approaches that tackle social issues can cultivate networks for social innovation projects.

In some countries (e.g. Germany, the Netherlands, the United States) and in certain sectors (e.g., engineering, pharmacy) and with certain types of HEI (e.g., technical-oriented, 'entrepreneurial universities'), there have long been intensive and varied collaborations between HEIs and their community, In others, such collaboration is less frequent, or perhaps not even part of "what is generally accepted". Looking to the future, it seems likely that a focus on skills for innovation and entrepreneurship will promote engagement between HEIs and their community – but the extent to which it will accomplish this remains unclear.

Interdisciplinary approaches

Innovation processes are enriched by the integration of knowledge from different disciplines, and by collaboration among people who have different points of view. These kinds of interaction can recombine knowledge in novel ways, and generate innovative solutions. Likewise, success in entrepreneurship may depend in part on a combination of team members from different backgrounds and bringing different skillsets.

Interdisciplinary pedagogies enhance skills for innovation and entrepreneurship. They develop learners' ability to synthesis ideas; to be ethically-sensitive; to balance subjective and objective thinking; to be creative; to tolerate ambiguity; and to think critically, proactively, unconventionally and flexibly (Ivanitskaya et al., 2002). An interdisciplinary approach prepares learners for diverse working environments. It improves communication skills, since it requires efforts to find meaning across disciplines (Woods, 2007). And finally, well-run interdisciplinary teamwork also develops tolerance, respect and openness – all of which are critical attributes in today's global society.

Interdisciplinary education presents challenges for HEIs though: it requires time, resources and coordination efforts. For instance, an interdisciplinary approach frequently involves team-teaching, with trainers from multiple disciplines co-designing and co-teaching lessons (Jones, 2010). This means that trainers have to commit the time and resources necessary to understand the languages of other disciplines languages, and to adapt their teaching material (Center for Teaching and Learning, Stanford University, 2007).

Initiatives in innovation and entrepreneurship education have most commonly begun in business and engineering schools, with their focus on business-creation and problem-resolution. But initiatives have expanded across a variety of fields, especially as the concepts of innovation and entrepreneurship have come to be understood more broadly, as the scope of social innovation and entrepreneurship have expanded, and as HEIs have moved to incorporate interdisciplinary pedagogies. Some HEIs, such as Aalto University in Finland and the Skolkovo Institute of Science and Technology (Skoltech) in Russia, have been founded with a mission that is directed towards innovation, entrepreneurship, and collaboration across disciplines.

Harnessing the power of students

Students themselves often lead innovation and entrepreneurship training initiatives. Governments and institutional leaders at HEIs need to understand the value of skills for innovation and entrepreneurship, and to promote such skills through formal education. But the student community also has an important proactive role to play here, especially given its ability to initiate powerful bottom-up initiatives. A recent international benchmarking of university-based innovation and entrepreneurship ecosystems reveals that "the growing strength and impact of the student entrepreneurial movement… ha(s) been responsible for some of the most innovative and engaging elements of emerging highly regarded entrepreneurial ecosystems" (Graham, 2014). Student-led entrepreneurship activities are collaborative in at nature: students partner with the local communities to develop solutions to challenges that affect them, and are at the same time connected to global networks of other students (Graham, 2014).

Students' innovation and entrepreneurship education initiatives are primarily extra-curricular in nature. They include contests, fairs, workshops, the creation of co-working spaces, and training programs. Although these activities tend to start informally, they can go a long way in raising HEI leaders' awareness of innovation and entrepreneurship training needs. Some research, in fact, argues that students themselves have driven the demand for entrepreneurship courses (Volkmann et al., 2009).

The HEI start-up sphere is evolving rapidly, particularly in the area of information technology entrepreneurship. This in turn entails rapid change in the skillsets that it requires. Students are showing their entrepreneurial spirit by adapting to global trends in innovation and entrepreneurship practice. They are making use of classic entrepreneurial skills such as comfort with trial and error, or the ability to recognise and seize upon opportunities and responding to the rapid evolution of innovation and

entrepreneurship activities. And students' entrepreneurial development of training initiatives in itself represents a crucial learning process which boosts their sense of self-efficacy.

HEI leaders face significant opportunities and challenges here: they need to identify ways to effectively interact, involve, and partner with students in the design and implementation of educational initiatives for innovation and entrepreneurship. Effective recognition of students as partners in the educational processes is a central challenge (and an opportunity at the same time). Developing streams of communication and collaboration can be difficult in certain institutional cultures. But, by taking genuine note of students' feedback, HEIs may adopt pedagogical innovations; invest in further training for educators; flexibly support students' drive to start companies, even as they are finishing their studies; and leverage students' global networks and inter-disciplinary opportunities to support enhanced collaboration.

Conclusion

Innovation and entrepreneurship are increasingly critical instruments for social and economic progress. This has led to a significant increase in HEI educational programmes directed at innovation and entrepreneurship – both in terms of their number and their importance. These changes in turn can trigger a transformation in how HEIs go about their missions. Graduate profiles are placing growing weight on innovation and entrepreneurship; skills for innovation and entrepreneurship are being incorporated not just in specific programmes, but also right across the curriculum; engagement with the external community is expanding; and the pedagogical methods and roles of trainers are being reshaped.

Successful approaches to innovation and entrepreneurship require that HEIs practitioners and policymakers address challenges on three interrelated levels. At the system level, success depends on the development of collaborative networks in which stakeholders with different points of view can work together to build educational models. At the institutional level, it requires a balance between bottom-up approaches (in particular, approaches led by students) and overarching guidance from HEIs. And at the "learning level", pedagogical models need to be continuously adapted, since students, available technologies, and expected learning outcomes vary; the benefits of interdisciplinary education have to be taken advantage of; and trainers need to team up with practitioners, and to be re-trained (when required). To better address these challenges, the leaders who steer education require improved knowledge bases on innovation and entrepreneurship, as well as overarching guidelines on how to develop the skills upon which innovation and entrepreneurship depend.

The changes that are outlined above all require significant will, commitment and flexibility. In fact, they require that institutions, governments, companies, students and other partners themselves behave in innovative and entrepreneurial ways.

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CHAPTER 7 - GRADUATE ENTREPRENEURSHIP SUPPORT: WHAT HIGHER EDUCATION INSTITUTIONS DO AND HOW GOVERNMENTS CAN SUPPORT THEM (LESSONS FROM IRELAND, POLAND, HUNGARY AND THE NETHERLANDS)

Andrea-Rosalinde Hofer[1]

Introduction

The promotion of youth entrepreneurship has become an important policy objective across the European Union and the OECD area. Public programmes targeted to youth entrepreneurs, such as start-up loans for people under 30 and start-up acceleration programmes, have been launched in many countries (OECD/European Commission, 2012). At the same time, international survey data confirms that students in higher education increasingly consider new venture creation, undertaken either on their own or together with others, as an attractive career option (Sieger et al., 2016).

For students who are about to enter the labour market, the question of whether or not to become an entrepreneur typically involves comparing different employment options (e.g. working for someone else, being one's own boss, employing others), and considering the implications these choices may have for personal development. Values, beliefs and social norms are generally considered to be among the factors that influence such choices. Recent cross-country studies (e.g., by the Global Entrepreneurship Monitor) suggest that educational institutions can also have an important influence on whether students choose starting-up a business as a career path.

With average entry rates of youth into higher education institutions (HEIs) now standing at close to 58% (Bachelor or equivalent study programmes across the OECD area in 2014), expectations are rising that HEIs will play a more active role in promoting graduate entrepreneurship.[2] Expected economic and social benefits associated with graduate entrepreneurship are high because of the assumed knowledge and technology intensity of business ideas and new business models, and because of the connectivity amongst start-ups – particularly in metropolitan areas.

In recent years, an increasing number of HEIs have been putting in place practices that support entrepreneurship amongst their students. Emphasis has been on entrepreneurship education activities aimed at developing a set of attitudes, knowledge and skills that allow students to identify opportunities and turn these into successful ventures. But entrepreneurship education cannot remain isolated if higher education is going to be an environment that is conducive to the development of young entrepreneurs. Thus, HEIs have introduced a variety of complementary support services over the last two decades, including mentoring; the active integration of students into research activities; the creation of co-working spaces and incubation facilities; help with intellectual property rights; and, assistance in accessing public and private financing. Demand for these services often comes directly from students and staff.

To effectively support nascent entrepreneurs, HEIs themselves need to be entrepreneurial in the sense of how they conceptualise and organise their key functions in the areas of education, research, and engagement. This includes their approach to resource allocation, staff incentives and continuous professional development initiatives – and to how they position themselves in local, national and global strategic partnerships. Public policy has an important role to play here by providing incentives and frameworks that promote entrepreneurial approaches at HEIs, and that support the development of

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1   The author acknowledges with gratitude the comments and contributions received from Jonathan Potter, Andrew Mc Queen, Liam Lynch and David Halabisky from the OECD.

2   In this document the term "graduate entrepreneurs" includes both students who have started-up a business while studying, and students who have graduated and started a business.

entrepreneurial graduates. The LEED Programme (a joint effort of the OECD and the European Commission's Directorate General for Education and Culture) has been supporting governments and HEIs in this process with its HEInnovate Guiding Framework for entrepreneurial and innovative HEIs.[3]

This chapter presents preliminary findings from country case study reviews that were undertaken in 2015-16 in Ireland, Hungary, the Netherlands, and Poland, and that used HEInnovate as a review framework. The chapter discusses how HEIs in these countries support graduate entrepreneurs – in particular through the creation of an entrepreneurial culture across the institution; the provision of training for nascent entrepreneurs; and through targeted support services for start-ups. For each of these activities, the chapter presents trends and selected examples of good practice, and identifies barriers and challenges. The concluding section discusses cross-cutting issues and identifies a set of outstanding questions to be addressed in subsequent work.

Higher education institution practices in supporting graduate entrepreneurship

The HEInnovate country reviews used study visits and online surveys to gather information on strategic objectives, resource allocation, and current and planned practices of HEIs.[4] Between five and nine HEIs were visited in each reviewed country; individual interviews, focus groups and roundtable meetings were organised with key actors at each HEI and their external partners. The HEIs that were part of the study also received assistance in using the HEInnovate self-assessment tool to identify barriers and possible areas for change. Further information on the study visits and on the HEIs surveyed is provided in the Annex to this chapter.

The following section describes current practices and trends, as well as barriers to the effective organisation of graduate entrepreneurship support at HEIs. These barriers will be further discussed in a subsequent section of this chapter.

### Creating an entrepreneurial culture across the institution

The entrepreneurship objectives of higher education institutions

A look into the development plans and strategies of the HEIs reviewed in the four countries confirms the importance of entrepreneurship-related objectives. Close to 80% of the HEIs rated "developing entrepreneurial competencies and skills in students" as important/very important. This was followed in importance by "promoting self-employment and business start-ups as a viable career option to students" (64.7%). Specific support for start-ups by students and staff is a less common objective, but was still cited as being of importance by more than half of the HEIs (Figure 7.1).

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3   HEInnovate is a long-term partnership initiative between the European Commission's Directorate General for Education and Culture and the LEED Programme. The stimulus for this exercise was the 2011 University-Business Forum. HEInnovate offers HEIs a free online tool (www.heinnovate.eu) to identify and act upon opportunities for improvement in the following seven areas: (1) leadership and governance (2) organisational capacity: funding, people and incentives (3) entrepreneurial teaching and learning (4) preparing and supporting entrepreneurs (5) knowledge exchange and collaboration (6) the internationalised institution, and (7) measuring Impact. The conceptual framework for HEInnovate has also been applied by the OECD in a set of policy review studies.

4   Invitations to participate in the online survey were sent to all HEIs in each of the reviewed countries and response rates varied. In Ireland, the response rate was 57%, almost the same as in Hungary (56.3%). At the time of writing, the survey in the Netherlands was still ongoing. The lowest response rate was noted for Poland, with 38 of its 415 HEIs (9%) completing questionnaires.

Figure 7.1: Entrepreneurship objectives of HEIs
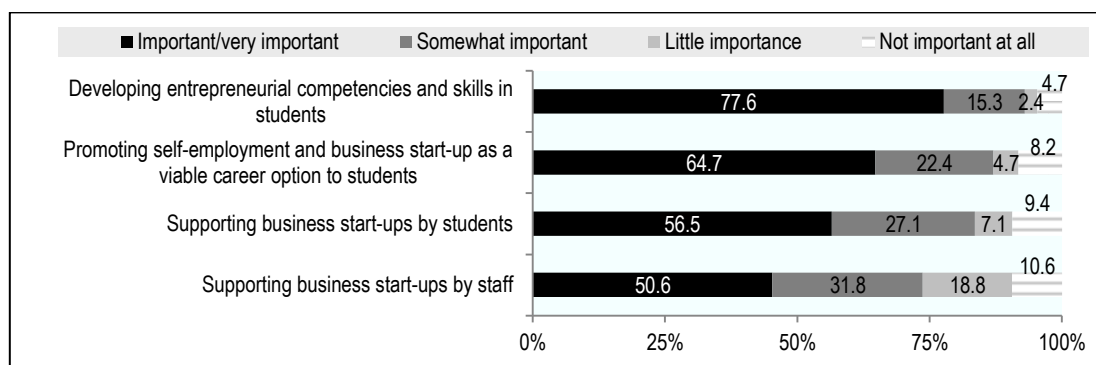
Note: A total of 84 HEIs responded to the question "How important are the following objectives for your HEI?" on a Likert scale from [1] Not important at all to [5] Very important. In this chart, the sum of the two highest categories [4] Important and [5] Very important is presented as "Important/very important".

Source: OECD HEI Leader Surveys Ireland (2015-16), Poland (2016), Hungary (2016), the Netherlands (2016).

Further statistical analysis shows a positive correlation between whether HEIs offer entrepreneurship education activities, and whether graduate entrepreneurship is an important strategic objective for them. Looking at the various types of HEI, the survey data also shows that generalist HEIs (which have a broad portfolio of faculties including art, humanities and social sciences (AHSS) and science, technology, engineering and mathematics (STEM) were more likely than specialised HEIs to consider entrepreneurship activities as important strategic objectives.[5]

Supporting cross-faculty synergies through staff incentives and strategic communication

Academic staff members are primarily recruited, evaluated and promoted on the basis of their research performance and their teaching track record, rather than for contributions they make to an HEI's entrepreneurial agenda. Incentives and rewards are more common for excellent performance in teaching and research than for involvement in commercialisation activities or for the mentorship of nascent entrepreneurs. However, the Netherlands is an exception here: many of its HEIs have standard performance criteria that include support for graduate entrepreneurship.

Most HEIs in the Netherlands and Ireland recognise the important role of administrative staff in entrepreneurship, and have created specific posts for entrepreneurship activities with well-defined and attractive career paths. Graduate entrepreneurship is also included in HEIs' performance contracts with national governments in Ireland and the Netherlands. This appears to have a positive impact on the use of incentives and rewards for entrepreneurship support, as it facilitates HEI-internal resource allocation to entrepreneurship-related objectives.

At the institutional level, dedicated high-level communication strategies can support efforts to anchor and widely promote entrepreneurship-related objectives. At the University of Twente, for example, entrepreneurship stands as one of the university's four "value pillars" alongside commitment, collaboration, and accountability. This is regularly communicated to all staff, and new employees receive a brochure in their welcome package that outlines the four pillars and shows how they play out in daily university life. Given the importance that it accords to the entrepreneurship pillar, the University of Twente includes inter-faculty collaboration in education and research employment contracts, as well as in its staff promotion criteria.

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5   Non-parametric correlation analysis, using Kendall's tau, shows correlations between "Supporting business start-ups by students" and the existence of entrepreneurship education activities with r=0.285, p=0.01; between HEI type and "Supporting business start-ups by students" with r=-0.307, p=0.01; and between HEI type and "Supporting business start-ups by staff" with r=-0.286, p=0.01

Support for students in their role as catalysts for an HEI's entrepreneurial culture

An entrepreneurial culture takes time to evolve: it is not built in an academic year or even over the term of a single rector. Students are key catalysts in developing this kind of culture. With their engagement and commitment to make things happen, they can be inspiring role models for other students and act as a powerful lever to improve an HEI's support for entrepreneurship.

Active encouragement for the student role in developing an entrepreneurial HEI culture is widespread in all four reviewed countries. Student research circles play an important role in building entrepreneurial culture. These student circles have a sponsor from the HEI itself – typically a professor from a relevant field. They are operated by students, but the sponsors provide mentorship and advice when needed.

Hackathons are another increasingly common practice being used to raise awareness of entrepreneurship in all four countries. Interdisciplinary teams (including computer programmers, software developers, graphic designers and students from various faculties) work together on a particular challenge. Hackathons typically last between a day and a week. Some are intended simply for educational or social purposes, although in many cases their goal is to create usable software. Students play a crucial role in the organisation of hackathons.

Entrepreneurship centres offering horizontal services

Entrepreneurship centres are a common feature of HEI entrepreneurship support structures. In Ireland and the Netherlands, these centres have been established at the majority of HEIs. They offer horizontal services and facilitate easy access and visibility inside and outside the HEI. Typically, these centres are closely connected with the HEI's senior management, e.g., the vice-rector/pro-vice chancellor or provost for research. Entrepreneurship centres also play a role in providing continuous professional development for HEI staff. Close to 80% of the HEIs surveyed were either offering some sort of training in entrepreneurship in-house, or supported staff participation in training offered elsewhere. Much can be gained along these lines from initiatives that are nationally co-ordinated. For example, the National Forum for the Enhancement of Teaching and Learning and the Campus Entrepreneurship Enterprise Network (CEEN) in Ireland, as well as the Dutch Academy of Research in Entrepreneurship and the Dutch Action Platform for Entrepreneurship, are actively involved in the continuous professional development of staff.

Combining resources across higher education institutions

The presence of multiple HEIs in close proximity (or even within the same city) generates an opportunity to build local ecosystems for entrepreneurship and to combine resources for graduate entrepreneurship support. An overarching umbrella structure or body (with an associated brand) can help expand the impact of entrepreneurship and knowledge exchange activities taking place at HEIs and with their local partners. The Amsterdam Center for Entrepreneurship (ACE), an initiative of four HEIs in Amsterdam, provides an example of this approach. ACE was established in 2006 to act as a joint platform for stimulating research and activities in the field of entrepreneurship – initially at University of Amsterdam, and later also at the Vrije University of Amsterdam, the Amsterdam University of Applied Sciences, and the Amsterdam University of the Arts. The basis of this partnership is a collaboration agreement signed in 2010 by the presidents of the four HEIs and by the deans of their faculties of economics and business. With the financial support of the City of Amsterdam, the Ministry of Economics, Rabobank and Ernst & Young, ACE has grown into a leading hub for graduate entrepreneurs in Amsterdam. Students from all four HEIs have access to its incubation and co-working spaces and services.

Anchoring entrepreneurship support in the core budget

A financial commitment to support entrepreneurship is a key first step towards generating and sustaining staff participation in an entrepreneurial agenda. Without an initial investment that is combined with continued seed funding from an institution's core budget, it is unlikely that entrepreneurship education

and start-up support services will gain ground at an HEI. It is therefore essential that entrepreneurship support be referenced in existing financial models, both at national and HEI levels. Ireland and the Netherlands are moving in this direction by including entrepreneurship support (viewed as part of institutions' third-mission activities) into performance contracts with HEIs and into related funding. In Poland and Hungary, entrepreneurship support may also be funded through the core budget.

Training for nascent entrepreneurs

Helping students combine their studies with their entrepreneurial intentions

The decision to start up a business may not be made during studies or even directly after graduation. Rather, graduates often make it after an initial period of employment during which they gain experience in how businesses and markets operate. According to the Global University Entrepreneurial Spirit Students´ Survey (GUESSS) (2016), around 8% of the students surveyed intended to start a business right after graduation, whereas about 30% of the surveyed students considered this a likely career option five years after graduation.[6] Students thus may not look for start-up support in the first instance, but rather for education activities that stimulate their creativity and require the application of knowledge to solving real-world challenges. These activities are often extra-curricular in nature. It is important that students have the possibility to document the competencies and skills developed in such activities (e.g. with diploma supplements or other certificates), in particular when they decide to delay creating a start-up and instead initially look for a paid job.

Another way to support students is to provide them with a tool to self-assess these competencies and skills. Dublin City University offers an example of such a tool. All its students have access to individual e-portfolios, which can be used to monitor personal development in six key areas. Students are encouraged to be:

1) Creative and enterprising, i.e. innovative and problem-solving, as well as adaptable and willing to pursue new ideas

2) Solution-oriented, i.e. able to marshal available resources

3) Effective communicators, i.e. able to negotiate effectively, to collaborate, and to influence others

4) Globally engaged (in terms of being locally and globally aware), valuing tolerance and cultural diversity, and committed to civic engagement

5) Active leaders

6) Committed to continuous learning in the spirit of inquiry, reflection and evaluation

Students who start up a business during their studies risk abandoning their studies. HEIs can help these students successfully complete their studies by, for example, allowing them to suspend their studies as they start up their business, and/or by giving them the chance to focus part of (or all of) their entire graduation thesis on a research question that is related to the start-up. The latter approach is currently in place at the Erasmus University of Rotterdam.

Beyond the "spark of genius"

Even if the "spark of genius" is important for entrepreneurship, most of what is needed to successfully implement a new idea can be learned. Thus, Rasmussen et al. (2011) conclude from a longitudinal study of academic entrepreneurs in Norway and the United Kingdom that HEIs can significantly influence the

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6   GUESSS (Global University Entrepreneurial Spirit Students´ Survey) is a global survey of students' entrepreneurial intentions and activities immediately after graduation and five years afterwards. It began in 2003 and is run by the Swiss Research Institute of Small Business and Entrepreneurship at the University of St. Gallen. In the 2016 edition, 122 509 students from 1 082 HEIs in more than 50 countries responded.

initial phases of the competency development of young entrepreneurs. The starting point here is "opportunity refinement", i.e., the competency to discover opportunities emerging from the content and the contextual knowledge that students gain in their studies, as well as opportunities that arise from involvement in research activities, and to refine these into viable business ideas. This competency is complemented by the ability to leverage internal and external resources, and to "champion", i.e. to take leadership in organising these resources in the form of a new firm.

A wide range of teaching methods are typically used to develop entrepreneurial competencies (Figure 7.2). Results of the HEI Leader survey found that the most commonly used teaching methods are case studies (75.8%) and business plan preparation (71.2%). The involvement of entrepreneurs in training nascent entrepreneurs, for example, by having them give guest lectures and work with students on start-ups or consultancy projects, is another common approach that allows students to gain insights into the entire course of the entrepreneurial process, from idea generation to venture creation and business development. And student start-ups can also provide excellent role models, as students tend to more easily identify with their peers.

Figure 7.2: Teaching methods in training nascent entrepreneurs
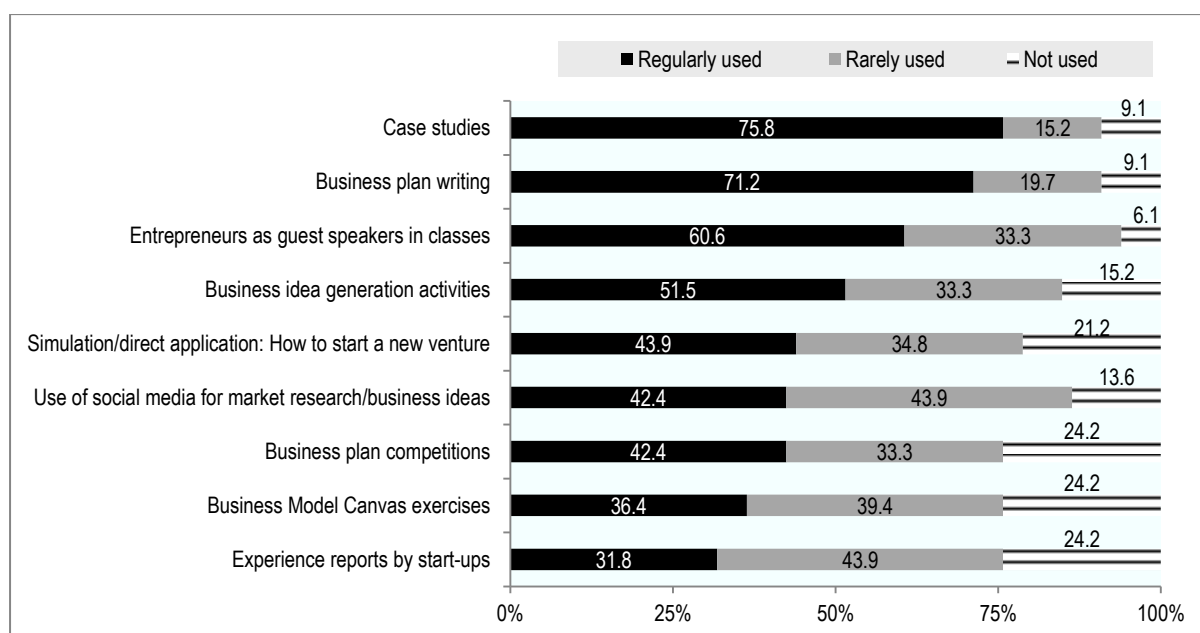
Source: Note: A total of 64 HEIs responded to the question "To what extent are the following teaching methods currently used in the entrepreneurship education activities at your HEI?" choosing one of the following answer options: [1] Not used, [2] Rarely used, [3] Regularly used, [4] Primarily used. For this chart the sum of the two highest categories [3] and [4] is presented as "Regularly used".

Source: OECD HEI Leader Surveys Ireland (2015-16), Poland (2016), Hungary (2016), the Netherlands (2016).

Interdisciplinary activities

To help nascent entrepreneurs develop the competencies they need, education and training programmes have to cover both technical and social skills. Ideally, such training should be available for all interested students, regardless of their area of study, because many innovative and viable business ideas are likely to arise from the combination of technical, scientific and creative studies. Across the four countries examined, business start-up courses with a focus on "opportunity refinement" are at present primarily offered in the fields of business and economics. But such courses should be open to all students, as idea generation and opportunity refinement activities that make use of interdisciplinary groups of students (i.e. with diverse backgrounds, interests, knowledge and skills) result in more diversity in the ideas and projects that the groups come up with (Neck and Greene, 2011). A main challenge facing interdisciplinary activities though is their dependence on faculty buy-in; not all faculty members view entrepreneurship as relevant to their field. To overcome this barrier, idea generation and opportunity refinement activities

are often organised outside the curriculum. Student demand for these activities is increasing, as data from the HEIs that were surveyed confirms.

Two good examples of idea generation and opportunity refinement activities can be found in Hungary:

- The Team Academy Debrecen began in 2010 at the University of Debrecen as part of an international network based on a Finnish approach to learning. Students from various Bachelor of Science programmes participate during their last year of studies. Small teams of students work as real companies.

- Demola Budapest, which is also based on a Finnish initiative, offers a second example. It was created as an open innovation laboratory at the Budapest University of Technology and Economics in 2012. Multinational corporations such as Vodafone, Siemens and Canon as well as Hungarian firms seek solutions to real-life challenges from Demola students. Emerging business ideas can be purchased by companies within a few months of course completion, and the largest share of the price is paid to the students. If the partner company does not want to purchase the final product, ownership rights revert to the students who invented/produced it.

*Collaboration with external partners*

HEIs have developed specific training activities to enhance students' capacity to leverage resources and champion new ventures. To be effective, these activities typically require experienced trainers who have received training in entrepreneurship and business start-ups – and ideally, who have first-hand experience in these areas. The involvement of external partners in training nascent entrepreneurs provides an important source of knowledge and experience. Case studies, project work and tandem-teaching (involving academic staff and individuals from industry) ensure that courses are relevant and practical.

In the Netherlands, VentureLab provides an example of this sort of approach. VentureLab's motto is: "building a business, let alone a fast growing company, is teamwork". It started around 25 years ago at NIKOS, the Expertise Centre for Technology-based Entrepreneurship at the University of Twente. VentureLab combines support for technology-based start-up businesses with a business growth accelerator for established companies. Because of the extremely diverse background of its participants, i.e., business owners, managers, and students, VentureLab does not offer a training programme where all participants start at the same time and follow the same programme. Instead, it offers a highly flexible and customised set of training routes tailored to the needs of participants. The programme includes regular presentations in front of a panel of entrepreneurs and investors.

The HEIs that were surveyed report collaborating with a range of partners in their training offer for nascent entrepreneurs (Figure 7.3). Strategic partnerships with technology parks and incubators (64.2%) and entrepreneurs (58.2%) are most common, while collaboration with banks is somewhat less frequent (38.8%). Venture capitalists and business angels were partners of almost half of the surveyed HEIs (47.8%). Significant differences can be noted across countries. Whereas all HEIs in Ireland reported collaborating with technology parks and incubators, this was the case for less than one-third of the HEIs in Hungary. Collaboration with entrepreneurs was also least common at Hungarian HEIs, where support for start-ups is a more recent phenomenon than in the other countries.[7] Banks are a common partner of HEIs in the Irish sample (70.6%). For example, the Bank of Ireland is an important sponsor of co-working and maker spaces at institutions.

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7   Only one third of the surveyed HEIs in Hungary reported currently offering start-up support, compared to two-thirds that offer entrepreneurship education activities, such as general courses and specific training.

Figure 7.3: Partners of HEIs in training nascent entrepreneurs
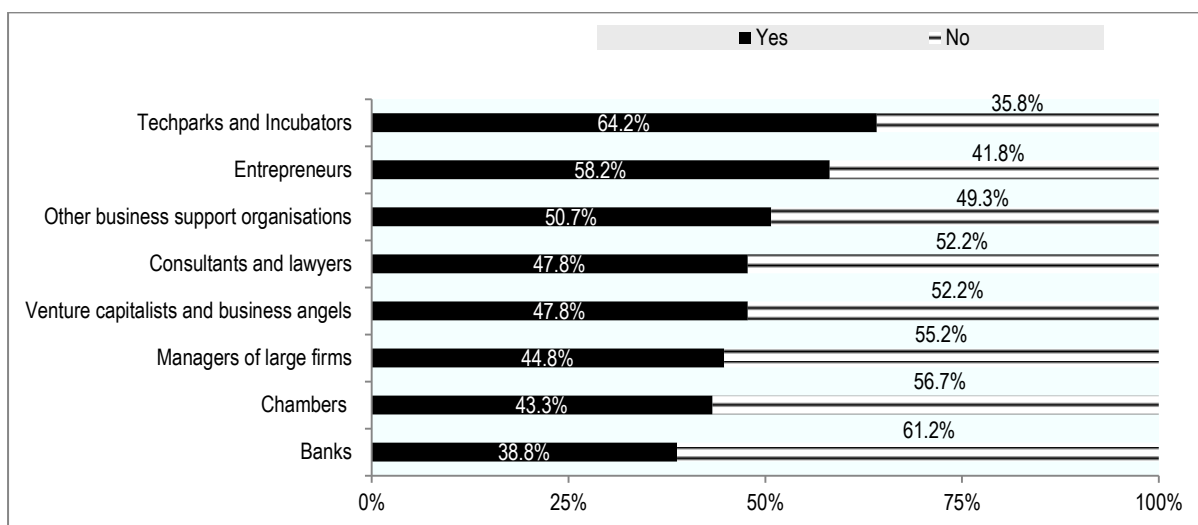
Source: Note: A total of 67 HEIs responded to the question "With regard to this activity, does your HEI maintain strategic contacts to the following organisations/individuals?" Activity: separate questions were asked regarding strategic partners in (i) entrepreneurship education, (ii) start-up support activities, (iii) for both activities. Observations for (ii) and (iii) are presented in this chart.
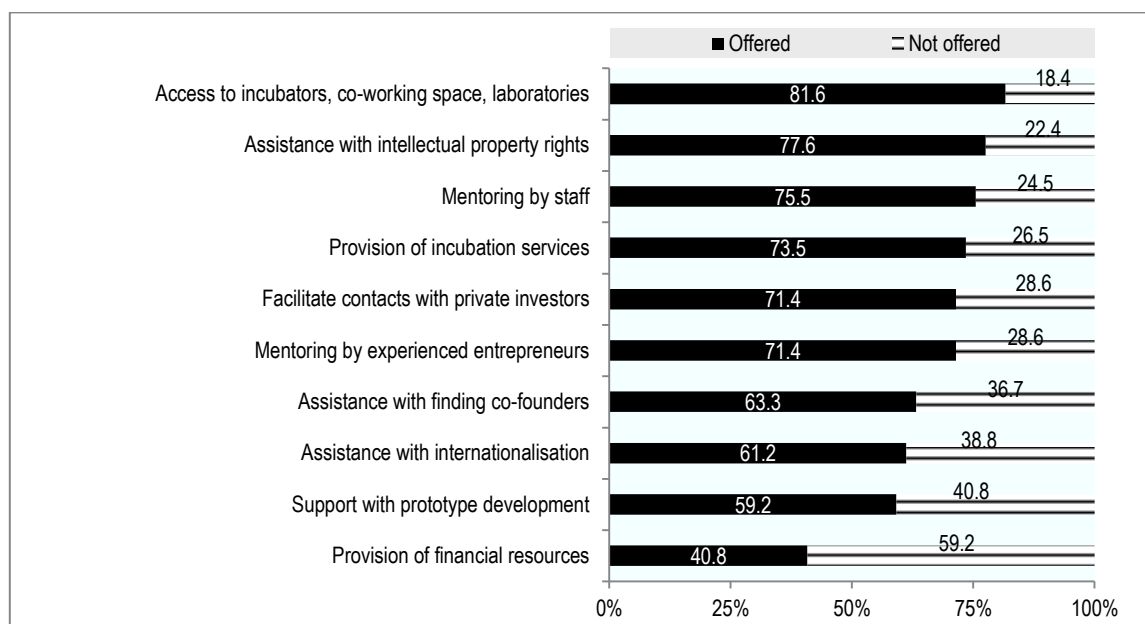
Source: OECD HEI Leader Surveys Ireland (2015-16), Poland (2016), Hungary (2016), the Netherlands (2016).

Targeted start-up support services

Entrepreneurship education activities needs to be paired with supports for students and graduates who want to create a new business. Approximately three quarters of the HEIs surveyed offer both entrepreneurship education and targeted start-up support services. But the survey data points to a gap between the availability of training and that of targeted start-up support services. Only half of the HEIs in the sample who offer start-up support reported students as one of their target groups. Staff members, on the other hand, have more access to start-up support (74.6%) than to training activities (47.3%). This is a missed opportunity: these kinds of activities, particularly when organised in a highly creative context and involving different disciplines, provide very fertile grounds for idea generation and team building, and are important in scouting practices that focus on research commercialisation.

The key to success in starting up a new business is often not the business idea itself, but rather access to resources. Young firms have to overcome a double constraint: a lack of internal resources and limited access to external resources. They have to simultaneously gain contacts and a position in existing networks, and build their firm's organisational structure. The reputation and networks of an HEI can help graduate entrepreneurs reach the credibility thresholds that their new ventures require by supporting the development of both weak and strong ties. Weak ties result, for example, from participation in interdisciplinary education activities, and they provide graduate entrepreneurs with new knowledge. Strong ties, on the other hand, allow new entrepreneurs to access resources and sensitive information (Hoskisson et al., 2011, c.f. Granovetter, 1973). Targeted start-up support is a way of developing strong ties. It includes a range of different services, as the survey data confirms (Figure 7.4).

Figure 7.4 Targeted start-up support services in

Source: Note: A total of 49 HEIs responded to the question "You've stated earlier that your HEI currently offers special support measures for individuals or teams, who are interested in starting-up a business. What special support measures are currently offered at the HEI?"

Source: OECD HEI Leader Surveys Ireland (2015-16), Poland (2016), Hungary (2016), the Netherlands (2016).

Supporting the development of strong ties

Mentoring and the colocation of nascent firms are common approaches to enhancing the development of strong ties. Matching nascent with experienced entrepreneurs increases a new business's chances of success, and can help to make other support services more effective (Stuart and Sorenson, 2007). Mentoring can also be provided by academic staff with entrepreneurial experience. Among the HEIs surveyed, mentoring by staff (75.5%) was slightly more common than mentoring by experienced entrepreneurs (71.4%). HEIs can also facilitate team formation by helping nascent entrepreneurs find co-founders. This is one of the less commonly reported practices though, and is currently offered by fewer than two-third of the HEIs surveyed.

Incubation facilities can make an important difference in early stage development at graduates' firms. The use of incubators and other physical spaces (e.g. co-working spaces, maker spaces and laboratories) enables students to develop greater connections between their studies and their start-up activity. Makerspaces, i.e. places where people can "gather to share resources and knowledge, work on projects, network, and build" (Educause Learning Initiative, 2013) are one form of incubation, and one which places a greater emphasis on physical space than on mentoring and expert advice (with advice often provided by user-peers instead). They are a technology-grounded concept based on learning-by-doing in a multidisciplinary context. The users of makerspaces have free access to technology and collaboration space. One example is the Blackstone LaunchPad at the University College Cork (UCC) in Ireland. UCC is one of three Irish HEIs that are collaborating with the Blackstone Foundation in the United States in a co-funded campus entrepreneurship programme. At UCC, a shared space is under construction in the library building, with grid spaces and whiteboards for creativity exercises and presentations. The aim is to offer maximum access to students, ideally at all hours of the week. This will involve a repurposing of the entire building, something that UCC has committed resources to. A full integration of the facility into UCC's structures (including staffing arrangements which will include both UCC and Blackstone employees) is underway.

Providing access to incubators, co-working spaces and laboratories is one of the most common start-up support services at the surveyed HEIs (81.6%). The incubator facilities are not always located on campus

or part of an HEI. On-campus incubation facilities – offering for instance free or subsidised premises for student businesses, access to laboratories, research facilities, free use of IT services, as well as coaching and mentoring – are present at many HEIs in the four countries (73.5%). There are significant differences across the countries, though. Whereas all HEIs in Ireland and most HEIs in the Netherlands provide incubation facilities on campus, only a few HEIs in Hungary do so. In Poland, the incubators belong to the Foundation of Academic Incubators of Entrepreneurship (AIP), which is a private foundation. There are 56 AIP incubators in the network across the country. AIP also operates "Business Links", a network that provide a virtual address, co-working space, technical and organisational support, and networking and pro-innovative services to entrepreneurs and their companies during the pre-incubation and incubation phases. These centres offer space for student entrepreneurs to operate their business.

The facilitation of access to private financing, both for student and graduate entrepreneurs, is an essential component of targeted support. Different approaches can be observed at HEIs – with these differences often determined by the local context and the strength of the local economy. Possible approaches include bringing nascent entrepreneurs and investors together in networking events; building relationships with local financiers to facilitate access to micro-credit; and informing students about the potential of crowdfunding. Larger HEIs may also have the resources needed to create their own seed funds.

Survey findings suggest that access to financing is mainly directed towards public funding (83.7%). Facilitating contact with private investors was less common (71.4%). This is partly explained by the presence of public funding programmes for start-ups, which use HEIs as a main implementation channel. Slightly more than 40% of the HEIs surveyed were themselves providing financial resources in the form of seed funding; this is a new development, and none of the HEIs visited during the country reviews were doing this.

The reviews found that there is a debate about whether entrepreneurship support should be offered only to currently enrolled students, or also to alumni. As noted above, the choice to start up a business may not happen during or immediately upon graduation. Given the potentially important role of HEIs in contributing to the capital required by a new firm, it seems natural to extend entrepreneurship support to both students and alumni.

Common barriers, preliminary policy recommendations and questions for further research

Analysis of HEI practices and national frameworks in the first round of HEInnovate country reviews has identified several common barriers that can stand in the way of graduate entrepreneurship support. Governments can help HEIs address these barriers through targeted measures and pilot initiatives.

Common barriers and preliminary policy recommendations

Changes are needed in higher education regulatory frameworks to increase the effectiveness of graduate entrepreneurship support

Governments in all four of the reviewed countries have assigned HEIs an important role in promoting graduate entrepreneurship. Their national policy support frameworks, however, vary substantially.

In Ireland and the Netherlands, significant efforts are being made to build a strong and sustainable graduate entrepreneurship support system. This approach includes long-term funding for strategic initiatives, training programmes, and HEI networks. At the institutional level, the approach has led to a wide range of initiatives including entrepreneurship education modules across different faculties; incubation facilities and acceleration programmes; and incentives and rewards for staff to share research results for commercialisation by students, and to join start-up teams.

In Hungary and Poland, the promotion of graduate entrepreneurship at HEIs is a relatively new phenomenon, and is not fully supported by national policy. As a result, institutional-level initiatives

(although now growing in number) often have to rely on the efforts of committed individuals. This makes it more difficult to mobilise and sustain resources, both within any given HEI and across its partners. Moreover, funding for support infrastructure and services in these countries (as in Ireland) has been quite reliant on European Union Structural Funds. These funding streams are often short-term in nature, which can lead to discontinuities and to the duplication of initiatives.

Without initial investments and continued funding from core institutional budgets, it is unlikely that entrepreneurship education and start-up support services will gain much ground at an HEI. It is thus essential that entrepreneurship support be referenced in existing financial models, both at the national and the HEI level.

The inclusion of graduate entrepreneurship in performance contracts between national education ministries and HEIs can lead to a productive re-examination of the terms and conditions of employment at HEIs. This might translate into incentives and rewards that support entrepreneurship, e.g. freeing up time from teaching, providing funding for additional research assistants; and permitting staff to work part-time or take a sabbatical to work in a start-up/spin-off. Performance contracts can also stimulate HEIs to measure the impact of graduate entrepreneurship support – something that is often not captured in standard metrics.

For students, managing the requirements of a full-time study programme while pursuing their start-up dream can be difficult. HEIs can make things easier for students by providing them with a way to document the competencies and the skills they gain from entrepreneurship activities; by allowing them to suspend their studies to start up a business; and by making it possible to partially or fully focus their graduation thesis on a research question that is related to a start-up. However, these approaches may all require changes in higher education regulatory frameworks.

There are gaps in coordination and collaboration (across HEIs and with local business support organisations) in the provision of graduate start-up support

To succeed in providing quality support for nascent entrepreneurs, HEIs will often need to rely on partnerships with business support organisations. The basic start-up support provided by HEIs should be connected with organisations providing more specialised support. If new firms are to make a smooth transition from basic support to advanced support, there needs to be strong collaboration with local, regional and national organisations that provide start-up and business development support. In Poland and Hungary, where the role of HEIs in graduate entrepreneurship support is new and still evolving, HEIs face greater difficulties in integrating their own offer with that of business support organisations. As a result, students and graduates tend to look for start-up support only outside their HEI.

HEIs should work with other national stakeholders to strengthen the support infrastructure for venture creation within HEIs. The aim should be to build basic support for new venture creation which is embedded in the wider entrepreneurial ecosystem. Finding the right approach –one that matches available resources with the needs of nascent entrepreneurs – should be the starting point here. Not all HEIs will be capable of establishing their own support infrastructure for entrepreneurship, nor have the will to do so. Collaboration with other HEIs can help overcome barriers, for example, through a shared-service organisation for start-up support.

The impact of graduate entrepreneurship support is not well documented and measured

More policy relevant research on the impact of graduate entrepreneurship on the growth and innovation behaviour of firms is required, as is research on the wider impact of graduate entrepreneurship on HEIs and their core functions, i.e. education, research and engagement. There are many examples of initiatives to support graduate entrepreneurship that have had significant impact. However it might be fair to say that individual HEIs, and the sector as a whole, have not been very effective at telling their story and making the case for funding and investment. If it is to gain the support of policymakers and the public for new and continued investments, the higher education sector needs to speak with a single voice in highlighting the impact of its support for graduate entrepreneurship.

Despite these gaps, it is evident that graduate entrepreneurs can have a great impact on how HEIs are perceived by prospective students, and that they can help foster strategic partnerships with government and industry. The numbers and visibility of graduate entrepreneurs appear to positively influence student choices, particularly those of international students.[8] In each of the countries studied, internationalisation efforts of HEIs are increasing – in particular with a view towards attracting international students. And there has been some real success in this respect. Ireland and the Netherlands have built on this success and introduced support mechanisms to retain students with entrepreneurial intentions. In the Netherlands, for instance, a residence permit scheme for start-ups gives ambitious entrepreneurs one year after graduation to launch an innovative business. Mentoring by an experienced entrepreneur or researcher based in the Netherlands is a criterion for eligibility. Many HEIs have seized on this new opportunity to launch and support international start-ups.

Graduate entrepreneurs can also attract public sector investment that seeks to boost the job creation potential of new firms and enhance their contribution to local development (e.g., new services, amenities). And support for graduate entrepreneurs is an effective way to commercialise knowledge that may otherwise remain idle within the HEI. Unlike academic staff, students and graduates do not face the pressure of choosing between investing in their career as an academic (e.g. publishing another impact-factor paper) and turning an idea or research result into a business.

Multinational corporations and large established firms often expect a boost for their innovation activities from collaboration with start-ups generated by HEIs, particularly in niche areas which require high levels of flexibility and creativity. Identifying start-up teams and their business ideas early on is thus a strategic priority for large innovator firms that collaborate with HEIs.

Questions for further research

These findings raise a number of questions for further research, including:

➢ What opportunities for graduate entrepreneurship, and for innovation activity in existing firms, are linked to the presence of international students at HEIs? How can HEIs, governments (at the national, regional and local levels), industry and community actors collaborate to seize on these opportunities?

➢ What are the enablers, the success factors and the barriers affecting institution-to-institution collaboration in support of graduate entrepreneurship? What can governments (at the national, regional and local level) and business support organisations do to support such collaboration?

➢ What can HEIs and national governments do to help entrepreneurial students successfully complete their studies and to effectively combine their studies with their start-up ambitions?

➢ How can HEIs effectively organise interdisciplinary approaches for graduate entrepreneurship support? What are the enablers, success factors and the barriers here?

These questions will be explored further in the next round of HEInnovate country reviews in the period 2017-18.

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8   An interesting trend, noted in all four review countries, is that prospective students from China, one of the largest emerging markets for student recruitment, are nowadays more interested in entrepreneurship and IT studies than in medicine and engineering.

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Annex

Table 6.1: HEIs visited during the reviews

Ireland	**Hungary**
(Study visits: 12-20 October 2015 and 22-23 November 2015)	**(Study visits: 29 February to 8 March 2016)**
Galway-Mayo Institute of Technology Limerick Institute of Technology University of Limerick University College Cork Dublin City University Dundalk Institute of Technology	Semmelweis University Szent István University University of Debrecen Eszterházy Károly University of Applied Sciences Széchenyi István University
The Netherlands	**Poland**
(Study visits: 20-24 June and 4-8 July 2016)	**(Study visits: 12-15 January and 29 February to 3 March 2016)**
Amsterdam University Amsterdam University of Applied Sciences Vrije University of Amsterdam University of Applied Sciences Rotterdam Erasmus University Rotterdam University of Applied Sciences Arnhem Utrecht University Twente University Maastricht University	University of Gdańsk State University of Applied Sciences Elblag Gdansk University of Technology Warsaw School of Economics Maria Curie-Sklodowska University Warsaw University of Technology Akademia of Kozminski in Warsaw

Table 6.2: Features of the HEIs surveyed

	Frequency	**Valid Percent**
Total number of HEIs in the sample	**84**	**100**
Age of HEI in 2016		
1-49 years	44	52.4
50-99 years	16	19.0
100 years and older	24	28.6
Size, approximate number of students in 2016/17		
Small HEI (up to 3 999 students)	30	35.7
Mid-size HEI (4 000-8 999 students)	12	14.3
Large HEI (9 000-29 000)	31	36.9
Very large HEI (more than 30 000 students)	11	13.1
Type of HEI (specialisation)		
Specialist HEI	32	38.1
Generalist HEI (i.e., AHSSH and STEM faculties)	52	61.9
Type of HEI (degree award authority)		
University	32	38.1
Other HEI	52	61.9
Countries		
Ireland	20	23.5
Poland*	27	31.8
Hungary	27	31.8
The Netherlands (*survey is ongoing*)	10	12.9

CHAPTER 8 – USING LABOUR MARKET INFORMATION TO SUPPORT STUDENTS' CHOICE OF FIELD OF STUDY IN HIGHER EDUCATION

Liam Lynch

## Why well-informed student choices matter

This chapter looks at the role that labour market information can play in shaping the decisions that students make about their higher education field of study, and explores how governments and higher education institutions (HEIs) are working to provide this kind of information.

In past generations, perhaps the main choice facing upper secondary school graduates was whether they should continue their studies or enter the labour market directly. Today, as record numbers of young people across OECD countries are entering higher education (OECD, 2016a), the primary question for many is not whether to pursue further studies, but rather what field of study and what institution they should choose.[1] In some countries, students are required to make decisions about their field as soon as they apply to enter higher education, while in others these decisions may sometimes be delayed until the first or second year of studies.

Growing participation in higher education has been driven in part by a realisation that higher levels of skills are increasingly required for individuals to achieve good labour market outcomes. Students themselves indicate that one of their primary reasons for participating in higher education is to develop skills that lead to a good job (YouGov, 2015; Grant, 2016). In fact, in some countries there is evidence that this labour market focus has become more important over time. For example, the proportion of first-year students in the United States who gave "to be able to get a better job" as a very important reason for attending college reached a high of 87.9% in 2012, a significant increase from 67.8% of students in 1976 (Pryor et al, 2012). The labour market advantages that accrue on average to higher education graduates, as compared to individuals whose highest level of education attainment is upper secondary or less (Figures 8.1 and 8.2), are clearly an important consideration for many students.

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[1] It is useful to draw the distinction between "broad", "narrow" and "detailed" fields of study. Broad fields are the highest order construct, and include for instance "arts and humanities", "business, administration and law" and "engineering, manufacturing and construction". Narrow fields are more specific, e.g. the field of "languages" classified under "arts and humanities". Detailed fields are more specific still, e.g. "literature and linguistics" classified under "languages". For more information, see UNESCO Institute for Statistics (2014), *ISCED Fields of Education and Training 2013 (ISCED-F 2013): Manual to accompany the International Standard Classification of Education 2011.*

Figure 8.1: Employment rates by highest level of educational attainment (populated aged 25-64) (2015)
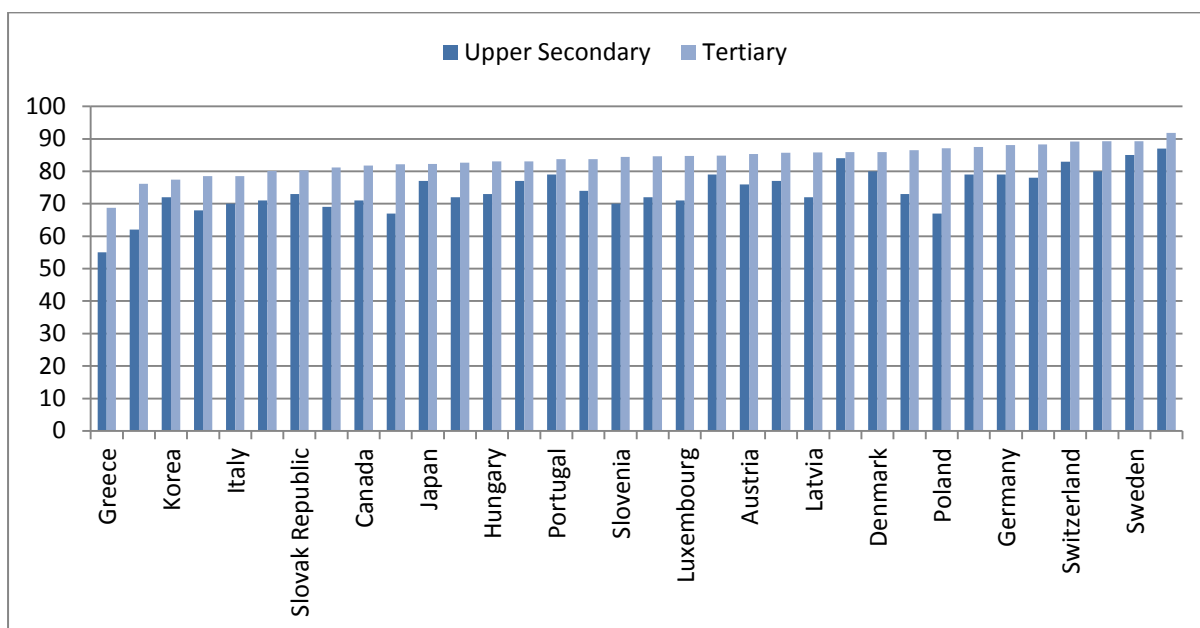
Source: OECD (2016), Education at a Glance 2016: OECD Indicators, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/eag-2016-en

Figure 8.2: Relative earnings of adults working full-time by highest level of educational attainment (population aged 25-64 with income from employment) (2014); upper secondary education = 100
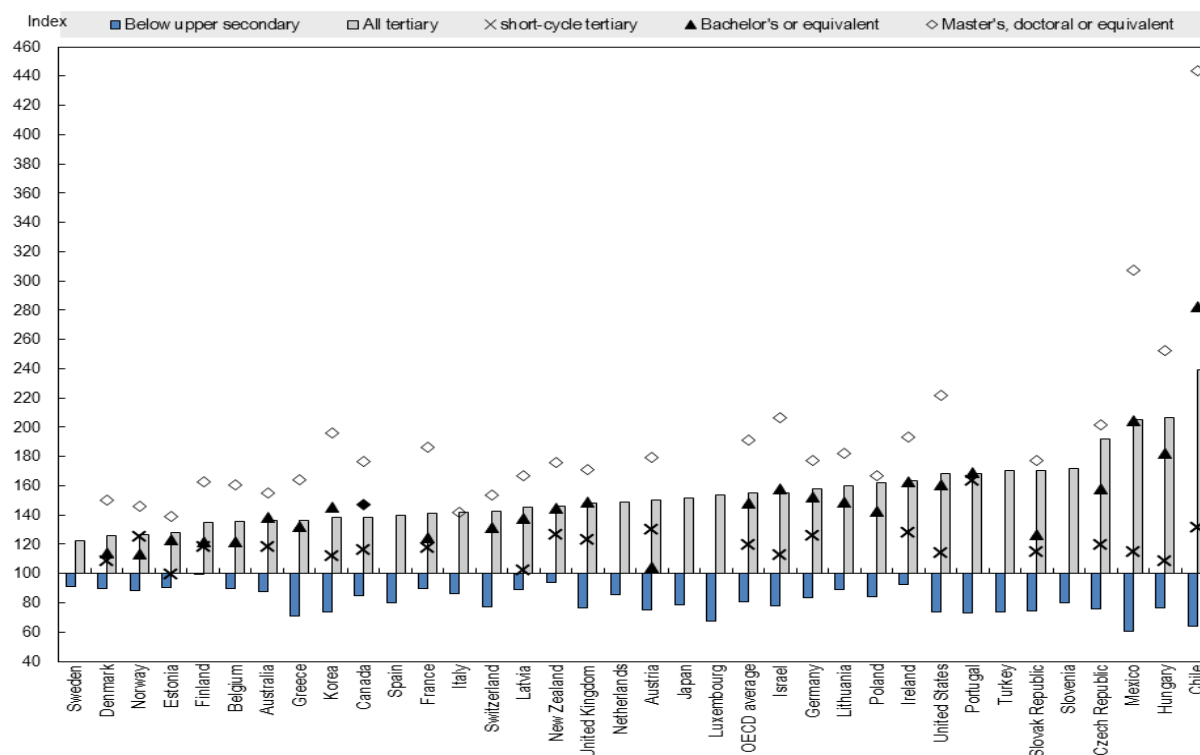
Source: OECD (2016), Education at a Glance 2016: OECD Indicators, OECD Publishing, Paris. http://dx.doi.org/10.187/eag-2016-en

Despite an average advantage, though, there are significant variations in the labour market outcomes of individual higher education graduates. In part these can result from differences in the ways in which individual HEIs develop students' knowledge and skills (including cognitive and social and emotional

skills), and so be linked for instance to whether an HEI has the resources and institutional culture necessary to deliver high quality learning experiences. But variations in labour market outcomes are also be linked to differences in the skills that students have developed before entering higher education, and to the extent to which they are prepared for higher studies. This may in turn be linked to personal characteristics of students such as their family background, the secondary school they attended, and relative cognitive abilities (Altonji et al, 2016). Institutional "selectivity" picks up on these various factors: selective institutions are often better resourced. They tend to attract well-prepared students. And their students can enjoy gains from a "peer effect" (i.e. their exchanges with other "elite" students, both during their education and in the labour market) (Zimmerman, 2016).

But a student's field of study is another important factor explaining variations in labour market outcomes (Figure 8.3). Some fields lead, on average, to higher employment rates, and to employment that is particularly well paid. Research from Norway, for example, finds that students in the field of engineering have post-graduate earnings that are on average three times higher than graduates from the humanities (Kirkebøen et al, 2014). In the United States, the highest earning Bachelor's degree field has median earnings that are over 300 percent greater than those of the lowest earning field (Carnevale et al, 2011).

Figure 8.3: Relative median earnings of young tertiary graduates, three years after completing a Master's degree, by field of study (upper secondary education = 100), average across OECD countries (various years, 2008-11)
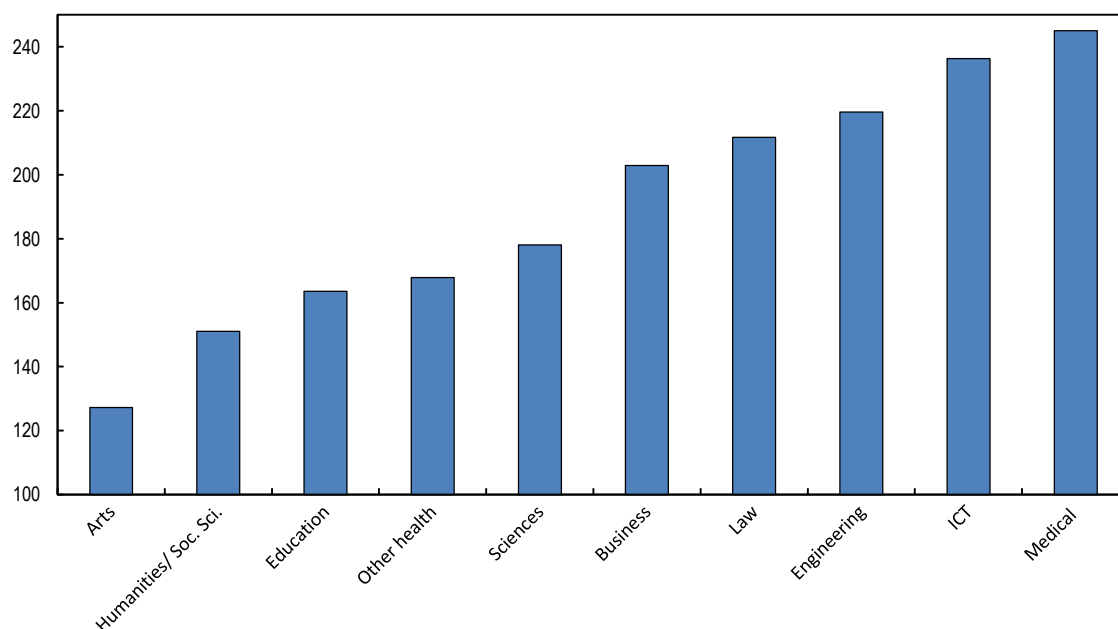
Source: OECD (2016a), Education at a Glance 2016: OECD Indicators, OECD Publishing, Paris. http://dx.doi.org/10.187/eag-2016-en

These data also show, though, that participation in higher education is not *sufficient* to guarantee labour market success (as measured by earnings or employment premiums). Graduates of longer programmes in any field of higher education can expect, on average, to earn more than the average individual who has upper secondary education as their highest level of attainment. But since certain fields (e.g. the arts) enjoy only a comparatively small earnings advantage, some graduates in these fields will earn less than the average (or median) upper secondary graduate.

Within a given broad field of study, the narrow or detailed field study that students choose can also lead to significant variation in labour market outcomes. For example, a medical student training to become a surgeon will likely have higher earnings than one who chooses to become a general practitioner (Altonji et al, 2016). And across the OECD, there is an almost 10,000 USD earnings premium for graduates who work as upper secondary teachers rather than pre-primary teachers (OECD, 2014a).

Just like variations amongst graduates in general, these differences in the labour market outcomes of graduates of various fields themselves reflect a number of factors. In part, they may simply be due to

"sorting": in some cases it may be the case that students with a relative cognitive advantage do comparatively well in the labour market whatever field they choose, but that they end up concentrating their choices in fields that have good labour market outcomes (Dalgaard et al., 2009). However, differences in outcomes also reflect in part differences in labour market demand for graduates with specific kinds of knowledge and skills, and the productivity advantage of these students – especially when they are employed in particular occupations (Machin & McNally, 2007).

Labour market demand for certain fields is also reflected, for instance, in the relative ease with which some graduates enter the labour market. Employers sometimes use field of study to screen applicants for potential jobs, since it signals that a given individual may have the skills, interest, and aptitude required to engage in quite specific types of work (Montt, 2015). For example, graduates from accounting, business management and administration, and finance programmes account for 72% of all accountants and auditors in the 34-44 age range in the United States (Altonji et al, 2016). And in other cases a given level of knowledge and skills, as reflected by a credential from a specific field, is an essential requirement for employment (OECD 2014b). Practitioners in professions like teaching, engineering, medicine and law are typically required to have completed field-specific educational programmes (and often, must also pass additional examinations).

But it is important not to fall into the "'field mismatch fallacy" by overstating the strength of the relationship between given fields of study and given occupations. The graduates of many fields – and in particular, of less "professionally-focussed" fields – end up working in a broad range of jobs. The PIAAC Survey of Adult Skills found that, across countries, an average of 39% of higher education graduates are working in an occupational field other than the one that might normally correspond to their field of study (Montt, 2015). But in most countries, there is no significant wage penalty associated with field-of-study mismatch – penalties only apply when workers overqualified, i.e. when they are working in a job that requires less than higher education. This suggests that students "working outside their field" are still using the skills they developed in higher education (e.g. cognitive and social and emotional skills), and that the labour market is rewarding them for this.

## Reasons behind choices of field of study

How students make decisions

The preceding section pointed to the consequences that choice of a given field of study may have on students' labour market success, and on their lifetime earnings. One recent study shows for instance that students who do well enough with a given choice of field might nonetheless have done better (in labour market terms) had they chosen a different field, for instance, humanities majors would have earned more had they majored in business (Altonji et al, 2016). But student choices also have broader implications for the labour market and the economy. If, for whatever reason, too few students are choosing to enter fields that are in labour market demand, economic growth may be weakened. The question of how students choose their field of study is therefore of significant interest to policymakers.

The literature surrounding student choice, field of study, and labour market information suggests that students make decisions about what to study in higher education based on three main factors: their perceived ability in a given field; the enjoyment, satisfaction or fulfilment that they expect to receive from working in occupations that it prepares them for; and the labour market outcomes they perceive to be associated with certain programmes and fields, especially earnings (Kirkebøen et al, 2014). Results from a survey in the United Kingdom (figure 8.4) reflect some of the concrete forms that these factors may take. Moreover, socio-economic characteristics (Briggs 2006), academic experiences and exposure to given fields of study (Fricke et al, 2015, De Philippis, 2016) and the availability of information (Altonji et al 2016, Hastings et al, 2016) can all exert an influence over how these factors play out in individual decisions.

By age 15, students generally have a sense of occupations that interest them. A survey of 15 year olds undertaken as part of the OECD's Programme for International Student Assessment (PISA) found that 81% of youth were able to name an occupation that they expected to work in (OECD, 2016b).

Figure 8.4: Reasons why UK students chose a particular field of study
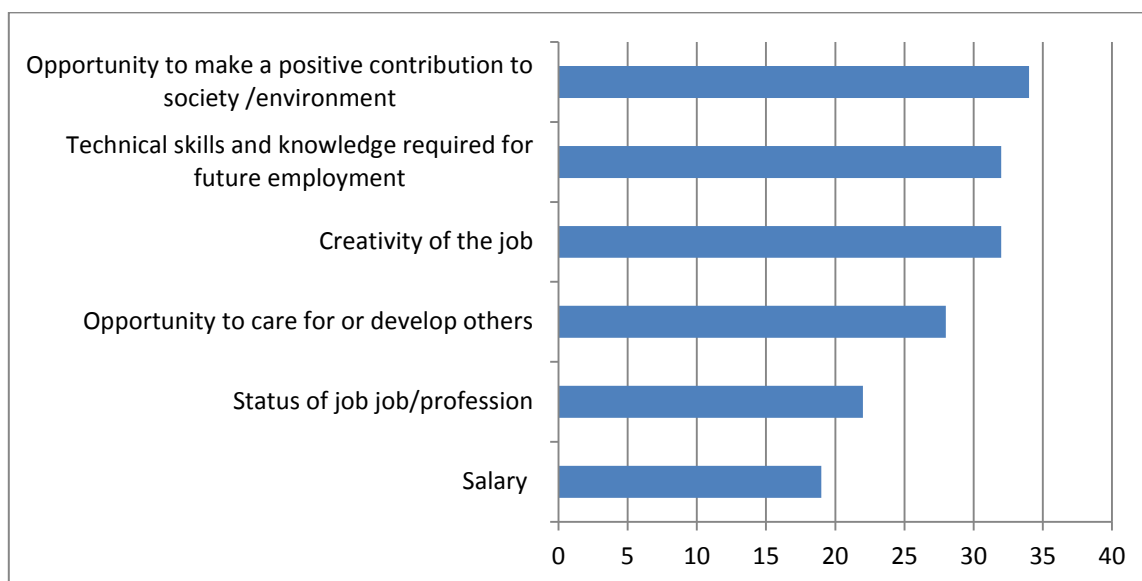
Source: HEFCE (2010)

Ability and preparation

Students are able develop a sense of their own abilities in a given field of study through the feedback they receive (e.g. via grades) in secondary school and in the early years of higher education. Research shows that upper secondary students often choose higher education programmes in which they have a comparative advantage, i.e. fields that match their abilities and interests (Kirkebøen et al, 2014) rather than those where graduates might expect to find the most stable employment or the highest earnings. For example, if a student has good academic skills and some interest in history but poor mathematics skills, he is more likely to enrol in a history programme than an engineering programme, even if he knows that engineering graduates have better labour market outcomes than history graduates.

Some students who initially wish to pursue a given field of study based on their interest and potential labour market outcomes may fall short because of a lack of preparation, skills or self-discipline. Certain fields may, for instance, require heavier workloads or have more stringent grading requirements that students are not able to easily meet. This can also explain some of the decisions about field of study that students make once enrolled in higher education, e.g. the high proportion of students who drop out of fields such as medicine, engineering and computer science and who perhaps even leave higher education (De Philippis, 2016).

Personal preferences, motivations and tastes

Unsurprisingly, research has found that students pay attention to non-labour market outcomes when choosing a field of study: these are part of the "utility" they expect from their studies. One experiment conducted on American higher education students found that a third of students would not change their major field of study, even when they were given information about its poor labour market outcomes (Wiswall & Zafar, 2014). Students like this who are relatively "immune" to labour market information appear to have other benefits and outcomes in mind. They may be motivated, for instance, by their personal interest in a field of study or by the projected personal fulfilment that jobs related to the field bring (Machin & McNally, 2007).

Interviews with American students training to be teachers give a concrete example of how such "non-pecuniary" factors can operate. The students reported that they were overwhelmingly motivated by interest, passion and by the fulfilment that comes from working with young people and helping them

succeed (Tillman 2015). Projected earnings, which can be comparatively low for teachers in the United States, appear to have been less of a factor in these decisions.

Choices may also reflect preferences for certain processes of education, rather than for its outcomes. Students may find certain subjects intrinsically more interesting to study or perhaps less onerous, i.e. allowing more free time for other activities. Such preferences reflect in part the "consumption good" (rather than "investment") aspect of higher education.

Labour market factors

But even though their choices may also have other reasons, surveys of students (as well as experimental evidence) suggest that some students factor in possible labour market outcomes when choosing a field of study (Altonji et al 2016, Hastings et al, 2016, Grant 2016).

Labour market information may be more likely to influence students from certain types of backgrounds rather than others. For instance, when they are presented with information about the cost of higher education fields of study and average earnings outcomes of these fields, students of lower socio-economic status may be more likely than others to act on labour market information and to enrol in programmes that on average lead to higher returns (Hastings et al, 2016).

However, students often lack good information about the labour market outcomes of certain fields. A European survey found that with the exception of students in Germany, fewer than one in five upper students in selected countries report having received enough information about job opportunities related to their chosen field of study while in secondary school (Figure 8.5) (Mourshed et al, 2014). As a result, half of these students indicated that if given the chance to start over, they would likely pursue a different field or programme.

In the absence of good information, students may have to rely on inaccurate perceptions about the labour market. For instance, when asked about the median earnings in certain fields, students in an American study gave responses that included significant over- and under-estimations of what graduates in that field earn (Wiswall & Zafar, 2014).

Figure 8.5: Percentage of students who say they received sufficient information about the job opportunities related to various fields of study prior to deciding what to do following secondary school.
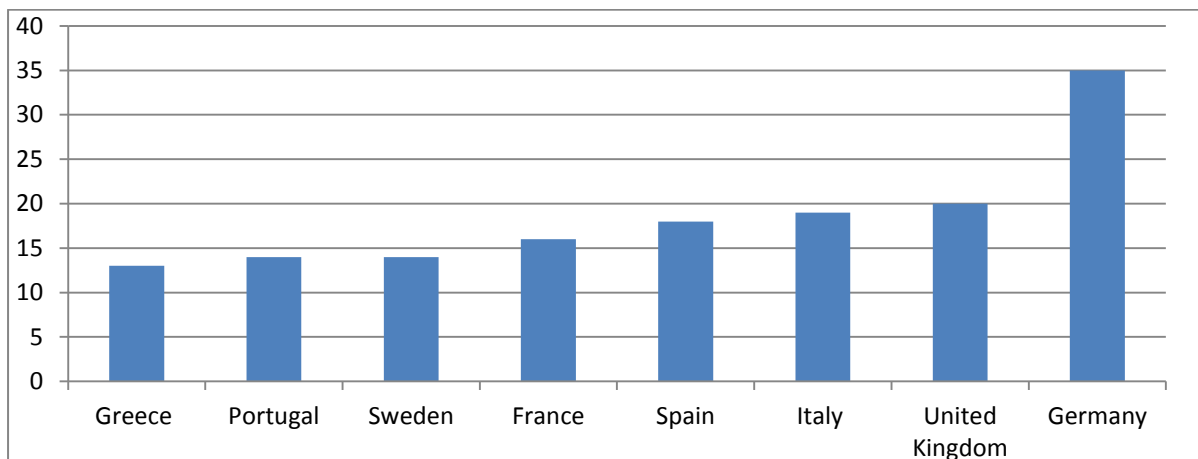
Source: Mourshed et al (2015)

Sources of Labour Market Information

Parents

There are significant risks involved in decisions that are based on inaccurate perceptions about the labour market: students might mistakenly choose a field that is in low demand, or avoid one that that the labour market is nonetheless calling for. This makes it is important for policymakers to understand where students get their information. Surveys in the United Kingdom and Chile suggest that parents are a common source of information (HEFCE, 2010, Hastings et al, 2016), and that this is especially important for students from higher socio-economic backgrounds (Hastings et al, 2016).

Australian data suggests that parental expectations play a significant role in determining whether youth pursue higher education. The Longitudinal Surveys of Australian Youth find that students whose parents expect them to go to university are around 11 times more likely to report that they plan to attend university (as compared to students whose parents expect them to do something other than university) (Gemici et al, 2014). The significance of parental influence is heightened by the fact that parents have their own perceptions of the labour market, and that these may or may not be accurate or realistic. It is far from certain that any given parent will be able to provide their children with the comprehensive labour market information that is required to make well balanced decisions, as many of their views may have been shaped by their own limited personal experiences rather than by a broader understanding of current labour market trends.

Regardless of their educational background, parents do tend to strong views about the careers that their children should pursue: a recent survey of 16 jurisdictions found that 80% of parents had a specific occupation in mind for their children. However, these expectations may not always be realistic. For instance, 19% of parents would like their children to go into medicine – a proportion far above that of the students actually enrolled in this field (HSBC, 2015).

The education system

School systems are another common source of information for students. At the secondary level, information comes from teachers and, especially, career guidance counsellors (HEFCE, 2010, Hastings et al, 2016). However, career counselling services in secondary school are often a fragmented and under-resourced, with a priority sometimes put on psychological counselling rather than labour market guidance (OECD, 2010). Evidence from one jurisdiction in Canada found that secondary school students were more comfortable approaching parents, relatives, friends and work professionals for career

guidance, rather than guidance counsellors at their school. Students felt that counsellors provided good information about the university and college application process, but that additional and more concrete labour market information was needed (Witko et al, 2005).

Government sources

As outlined later in this chapter, students also access government sources) such as labour market surveys and government websites) to get labour market information. But, as reported in a United Kingdom survey, these are significantly lower on the list of information sources that students consult when making decisions about which field of study to pursue (HEFCE, 2010).

Implications for delivery of information

Access to timely and accurate labour market information can help students develop knowledge and skills that facilitate their transition to the labour market, and that maximise their labour market outcomes. It can enable them to identify which skills and jobs are in demand (as measured by earnings or employment); which industries are hiring and where they are located; the education and training qualifications needed for specific jobs; and the types of job and sector that are projected to see growth. Information can also be a powerful tool to combat long-standing gender bias or social stigma surrounding certain jobs and fields of study (Mourshed et al, 2015), and to minimise skills shortages and mismatches (OECD 2016c).

The contribution that good student-focussed labour market information can make to sound choices, individual well-being and economic growth means that it is important that this information be made available in effective, responsive ways. This in turn has implications for governments and HEIs as they seek to support student choice.

Timing

To be effective, information needs to be provided to students early enough to shape opinions and allow them to react to it (e.g. to choose the right sequence of studies in secondary school and get the appropriate pre-requisites for higher education programmes). Information geared towards students who are near graduation may be useful, but by that point in their secondary school career many will have already committed to an academic path, specialising in certain subjects that narrow their range of higher education choices. This is especially true in many European countries where at age 15 or earlier, students are asked to choose between academic and vocational streams. Information and discussion about future careers, even before students enter upper secondary school, can thus be an important enabler of informed student choice.

However, to the extent that labour market information is relatively focussed on certain occupations or fields, its timing raises a challenge for policy makers and educational leaders. While students can benefit from information at earlier stages of life, there is some risk that information provided early on will be outdated by the time students are able to act on it (Cappelli, 2015).

This represents a more pronounced case of a general problem: even if students have the flexibility to respond to labour market information at the end of secondary school, it will take another two to four years education before they enter the labour market, by which time the labour market conditions may have changed. Sometimes these changes can be dramatic, and come with little warning (e.g. the tech bubble in 2000, the banking crisis in 2008, and the sudden drop in oil prices in 2014). Given such risks, the labour market information provided to students should not focus too narrowly on the needs of specific occupations and on their linkages to specific fields of study. Rather, it is important to also make the case to students for developing broad transversal skills (cognitive and socio-emotional skills that are portable across occupations).

Given this problem of time lags, it can also be effective to supplement the provision of past and current labour market information with robust labour market forecasts, which can provide students with some

sense of what the labour market may look like when they graduate from higher education. To ensure a greater likelihood of accuracy, forecasts might combine different approaches and different source data so as to be as relevant as possible to both local and national contexts (CEDEFOP, 2016). Nonetheless, while labour market forecasts may do a reasonably good job over time at projecting new entrants into and retirements out of the labour market, they are typically unable to foresee some of the large demand-side shocks described in the previous paragraph. And they may also understandably fail to take into account other potential discontinuities, e.g. the effects of a new technology on labour markets.

How information is presented

Given what is known about how students make decisions, certain approaches to presenting them with information may prove to be more effective. For instance, students are increasingly seeking information online, but the vast amount of learning and labour market information available can be overwhelming and can lead them to disengage (HEFCE, 2010). It is important to ensure that students are able to adequately filter information, and it can be effective to provide well-structured information through a single access point to provide a virtual "one-stop shop".

The design and use of digital web-based information tools should take into account the different levels of competence and comfort that individuals may have with online platforms. And online forms of delivery can work in synergy with approaches using other media such as telephone, mail, or direct person-to-person interactions. It is also critical to ensure that the information provided online is well-maintained and updated regularly (CEDEFOP, 2016).

Research suggests though that students are more likely to value and trust information that comes from someone with direct experience about the options being considered, and also from someone who has a personal relationship with them (Warwick et al., 2006). It is not surprising, then, that students may consider information from more official sources as less reliable and more abstract (Warwick et al., 2006). This suggests that on-line provision of labour market information is unlikely to be sufficient in itself, and that career counselling practitioners have an important role to play in building relationships with students and drawing on employers to communicate key messages about the labour market.

The role of governments in providing labour market information to support choice of field of study

Both governments and HEIs have an important role to play in providing students with information to help them make decisions about the fields in which they will study. But the approaches that each of these two actors take, while complementary, will differ somewhat. These differences reflect their relative strengths and their comparative advantages.

Governments have a strong advantage in the collection of labour market information at the aggregate level, and in disseminating this information via various media to the largest possible audience. No other actor in higher education systems has the capacity to use surveys, censuses and administrative data to collect information on such a large scale. Moreover, the public policy rationale for communicating information about graduate outcomes is clear. Governments want to ensure that students can carefully consider labour market factors when making choices about their education so that they maximise their own labour market success and, through their collective decisions, shape a labour force that has the skills and knowledge needed to drive productivity, innovation and growth.

Governments can disseminate labour market information in a variety of ways, including via statistical tables, reports in .pdf format, and text-focussed webpages. But more traditional formats risk being of little attraction to youth brought up in a digital era. The challenge for policymakers, then, is to get labour market information to students and to potential students in a comprehensive but easy-to-use and appealing format. With this in mind, governments are increasingly relying on interactive websites that present information about outcomes associated with specific fields of study. These allow policymakers to

present a significant amount of information in an effective way, and through a medium that is generally accessible to most students.

These websites usually combine quantitative information about the labour market outcomes with other information, e.g. about the types of skills and occupation that are in demand in the labour market, about programmes available in higher education, or about the availability of student financial assistance. They also often provide tools that help students explore their own interests, providing a kind of automated approach to "personalised" career advice.

But when making graduate outcomes information available, policymakers face the choice of whether to go beyond presenting the outcomes of graduates in the aggregate (but broken down by field and level of study), and report on outcomes of graduates of specific HEIs (again broken down by field/level, assuming the underlying data is available). This decision can have real consequences. On the one hand, many policymakers would argue that if the labour market outcomes for graduates of the same field of study are significantly different at different institutions, this reveals something important about the quality or relevance of the individual institutions and programmes themselves and students can make good use of that information when choosing a programme. On the other hand, though, there is a good deal of "noise" in institutional level data: better outcomes at one institution can reflect a whole host of factors (e.g. the local economy, the socio-economic status of students, their skills levels when entering higher education) that provide little relevant information about the actual quality or relevance of institutional-level programmes.

Unless students have a sophisticated understanding of labour markets, and of how individuals from different backgrounds and in different locations perform in them, they may not be able to make meaningful use of very granular information on graduate outcomes broken down by institution and field. In fact, such information carries some risk of leading to ineffective choices (at both the individual and collective level) if students indiscriminately link "quality of programme" with graduate outcomes. Policymakers continue to wrestle then with the question of whether to present information at the institutional level, or whether to focus reporting at the aggregate level where, since it is grounded in a larger population base, information will tend to be more solid and more reflective of actual labour market needs. In cases where governments do provide institutional level data, they need to carefully address the challenge of ensuring that such information is useful and that its benefits outweigh any perverse effects it might have.

Across OECD countries, there are many examples of government-sponsored websites that include information about graduate labour market outcomes broken down by field and level of study (and often by field/level at specific institutions). These sites recognise that labour market outcomes are one of the key factors that can drive student decisions, but not the only factor. And they are typically complemented by other websites and other forms of information.

- New Zealand's https://www.careers.govt.nz/ website reports on graduate median earnings and employment status measured one, two and five years after graduation for various fields of study (page located at: https://www.careers.govt.nz/tools/compare-study-options/), as well as on entry requirements and skills developed within detailed fields of study. The site also has self-assessment tools that allow students to explore the types of jobs that are well-suited to their interests and abilities.

- The Flanders website www.onderwijskiezer.be is hosted by the Centre for Student Counselling. It provides information about which courses high school students took before entering a specific field, and how these students performed in tertiary education. Students can access various self-assessment tools that allow them to better understand their skills, motivations and study habits, and in so doing identify academic programmes and careers that could be suitable for them. Information on this site can be combined with an annual report from the employment service of Flanders which provides information about the average unemployment rate for broad fields of study, one year after graduation.

- The Government of Canada's job career choice tool on the Jobbank website (http://www.jobbank.gc.ca/field_of_study_all-eng.do) allows students to draw on National

Household Survey data to get information about the employment, unemployment and labour force participation rates; median earnings; earnings ranges; job types associated with specific fields of study; and about regions of the country where salaries are highest for a given field. The website also gives students access to information from the National Graduate Survey about the extent to which graduates are working in jobs related to their fields of study, their satisfaction with their field of study, and whether graduates in a given field of study go on to further education.

➢ The Danish website www.Uddannelseszoom.dk allows students to directly compare up to three academic programmes from the same institution or from different institutions. The site includes information on which sectors graduates are employed in; average earnings ten years after graduation; and earnings range of the graduate cohort (showing the cut-off point for the top and bottom quartile).

➢ The Slovak Republic's web portal http://www.lepsieskoly.sk provides information about the labour market outcomes of higher education graduates (average income; projected income; unemployment rate; employers' demand for fields of study; average length of employment contracts; and, the skills that employers require). The information on the site is based on data drawn from a one-time survey of over 15,000 Slovakian graduates from 2008 to 2014, as well from the social insurance programme and from other administrative data.

➢ The United Kingdom's Unistats website (https://unistats.direct.gov.uk/) draws on the Destination of Leavers from Higher Education survey to provide labour market information about graduates six months and 40 months after graduation (broken down by field of study and by institution). It also provides information about student satisfaction, with the underlying data derived from the National Student Survey that more than 220,000 (mainly) final year students complete each year.

➢ In the United States, the federal College Scorecard website (https://collegescorecard.ed.gov/) provides information at the institutional (but not field of study) level about median salary ten years after graduation, and the percentage of students who have started paying down their loan after four years. It also has information about tuition fees; the composition of the student body; average standardised test scores of entering students; the typical debt load of students following graduation; graduation rates; the number of graduates; and retention rates year to year. At the sub-national level, a few American states provide more detailed information about graduate labour market outcomes broken down by field of study *and* institution, e.g. Texas' My Futuretx site (http://www.myfuturetx.com/).

Improving the quality of graduate outcomes information

There have been recent advances in the kinds of information that governments can provide on the labour market outcomes that are associated with specific fields of study. For instance, it is becoming increasingly possible to link student data with tax data on employment and earnings. This allows for a more accurate reporting of certain labour market outcomes, overcoming some of the disadvantages associated with traditional graduate surveys (e.g. response rates, the challenges of following graduates using a longitudinal approach).

In the United Kingdom, recent changes to legislation mean that tax and administrative data can now be linked to education data. The initiative was first proposed in a government white paper entitled, "Success as a Knowledge Economy: Teaching Excellence, Social Mobility & Student Choice". The paper suggested that, "this rich new data source will give students the information about the rewards that could be available at the end of their learning, alongside the costs ... By increasing transparency and making better use of public data than ever before, we will shine a light on the employability outcomes of courses and institutions for students to evaluate alongside other considerations" (United Kingdom Secretary of State for Business, Innovation and Skills, 2016). An initial set of data was released for review in December 2016, but it is not yet available in an interactive format.

Policymakers are also exploring ways to improve the quality of graduate outcomes information by expanding the scope and depth of comparable data. For instance, the European Commission has sponsored work to examine the feasibility of a pan-European graduate survey, the [Eurograduate](#) survey. If implemented, Eurograduate would allow for more detailed and comparable data about the relationship between higher education and the labour market; offer an expanded geographical reach for comparison purposes; and provide for the possibility of longitudinal observations (Eurograduate Consortium, 2016).

Considerations about other public policies

It is also important to keep in mind that policy efforts to enable good student choices will inevitably interact with a broader set of government policies, some of which may limit students' freedom of choice. For example, students' choices may be artificially limited by the availability of places in specific fields of study. In some higher education system, governments set absolute caps on the number of students who can be enrolled, e.g. New Zealand (New Zealand Productivity Commission, 2016). And in all systems, constrained public funding and/or specific labour market conditions mean that there will be explicit or implicit limits on the numbers of student who can enrol in (at least) certain fields. These often include fields that are comparatively expensive to offer (e.g. some sciences, engineering, or fine arts), or that combine finite labour market demand with a very specific skillset (e.g. medicine). Students who wish to choose these fields may simply not find open places. And in other cases, governments may choose to limit student choice by restricting the number of places in fields that have *poor* labour market outcomes.

The role of higher education institutions in providing labour market information to support choice of field of study

HEIs themselves often collect information on the labour market outcomes of their graduates. There is a clear business case for institutions to do this (i.e. to collect information that goes beyond what is collected by government surveys, etc.). Used carefully, such information can give provide them with a way to evaluate the quality and relevance of their programmes, and to enable improvement. On the other hand, the extent to which institutions make the information they collect publicly available (or at least readily available) to students will vary. A number of factors affect this decision.

The same considerations that apply to government reporting of the outcomes of graduates by field of study and institution also apply at the institutional level – though with additional challenges.

➢ If potential students are going to be able to meaningfully compare the outcomes of graduates of a specific field at one institution to those of graduates in the same field at another institution, they need to take into account a wide variety of factors which may not be immediately obvious to then. But the additional challenge is this: when it is institutions themselves that are collecting the data (rather than a centralised government office) the comparability of the data can itself become a problem, since different institutions may process their data in different ways.

➢ And if potential students are using institutional-level data to compare the outcomes of graduates in one field to another at the same institution, it might reasonably be argued that they are using data that are limited by the characteristics of the finite underlying student population on which it is based. To get a reliable sense of labour market outcomes associated with a given field, students might do better to look at the aggregate outcomes of higher education graduates in that field – or, at least, to look at this information as well.

But there are a number of reasons why institutions may nonetheless report information on graduate outcomes. Just like governments, HEIs have an interest in seeing their students make decisions that will stand them well in the labour market. This can be the case even if they face the particular problem of "built capacity" in specific fields that can make them reluctant to see too much fluidity in student choices, at least over the short- and medium terms (Altonji et al., 2016). Beyond these considerations, though, institutions may also face a regulatory requirement to collect and to report information to prospective

students. And in cases where graduate outcomes are particularly strong, HEIs may have a marketing interest in making their data widely available.

Sometimes HEIs will seize on economies of scale by working together to collect and disseminate information on graduate labour market outcomes though this information, once again, is not necessarily reported at the institutional level.

➢ For example, 279 colleges and universities from across the United States participated in the National Association of Colleges and Employers (NACE) *First Destinations for the College Class of 2015 Survey*, which collected labour market data from nearly half a million graduates at the Associate degree, Bachelor's, Master's and PhD level. Published as .pdf document but also making use of an interactive "dashboard" to present summary results, *First Destinations* provides information at the field of study (not institutional) level only. It covers standard information about employment rate and earnings, but also looks more deeply into the types of graduate employment, e.g. standard employment, entrepreneurial status, temporary or contract work, freelance work or military service.

➢ In Italy, AlmaLaurea ([http://www.almalaurea.it)](http://www.almalaurea.it) is run by a consortium of universities. Students can search for the outcomes of graduates by field of study and institution – looking as well at results for different graduating cohorts. AlmaLaurea also provides students with information directly from employers about the skills and personnel that they are looking for, and long-term forecasts of skills and employment needs. And there are numerous career-oriented services available as well.

Information from surveys like NACE's, or from government sources, can be disseminated through by the career counselling services and associated services (e.g. admissions departments) at HEIs. This is arguably where the comparative advantage of institutions lies: in their ability to make direct contact with students and potential students, and to help them make well-informed decisions about their initial choice of, and of possible changes to, their field of study. While sophisticated web interfaces can to some extent "personalise" information, they lack the potential for direct personal contact that can help students fully contextualise and understand labour market information.

Moreover, through their contacts with employers and alumni, HEIs may also have access to kinds of labour market information that complement more quantitative reports about graduate outcomes. They may, for instance, be able to provide students with good information about the "'transversal" skills (e.g. problem solving, communication and creativity) that local employers are looking for that go beyond the technical skills associated with specific fields of study. A few examples of the labour market information value-added of higher education institution career counselling services include:

➢ Manchester University (United Kingdom), which has a programme that enables students to meet alumni who are working in various fields and ask them online questions. Students gain a sense of workplace and organisational culture, and get practical tips as they think about their transition to the labour market. Manchester also offers the "my future programme", which is based on information from interviews with graduates who have succeeded (or struggled) in the labour market. This helps students identify skills that they could develop over the course of their studies, and practices that they could adopt, to better ensure success in the labour market after graduation.

➢ Maastricht University in the Netherlands is working to make reliable information available to students on what kinds of labour market outcomes they might expect from the university's programmes, and what graduates think about these programmes. This information, developed in consultation with the universities' faculties, will be available as part of a much broader approach to counselling that supports students as they think about careers and begin their search for work.

➢ Recognising the role that entrepreneurship can play in fostering employment opportunities that go beyond simply "getting a job with a firm", the career centre at Tartu University in Estonia is providing services to students to help them develop their entrepreneurship skills. For example, it

offers support for business idea analysis; consultation in business model development; advice in start-up and spin-off company development; seminars on the entrepreneurial mind-set; business planning (including knowledge about how to use the online business tools, and about product development); and, preparation for investor readiness.

➢ Career centres in the United States use their relationship with employers to gain insights into the transversal skills that are important for graduates of any field of study. Bringing the work of career centres together, the National Association of Colleges and Employers has prepared a guide to support college graduates' successful transition into the workplace that focuses on several of these key transversal skills: critical thinking/problem solving; oral/written communications; teamwork/collaboration; information technology; leadership; professionalism/work ethic; and, career management.

Conclusion

Students' choice of a higher education field of study is a complex decision, and one that has substantial consequences both for their own success in the labour market and for the shape of the skills supply that employers can draw upon. So, while labour market considerations such as potential earnings or employment are far from the only factor behind students' choice of a field of study, they can play an important part in decision-making. But without reliable information, students need to make their choices based on "perceptions" of the labour market that may be quite inaccurate.

Good information on the outcomes of past graduates is not a panacea that will somehow magically ensure good outcomes for future graduates. But if it is timely, reliable and user-friendly, such information can be an important tool to support students' decision-making. Governments are particularly well-placed to gather information about the labour market outcomes of graduates of different fields of study, and to present this information in user-friendly formats. The emerging ability of governments to combine administrative and educational data suggests that students will have access to even more helpful information in the future.

HEIs also typically collect of information on their graduates, if sometimes only in an *ad hoc* way. Institutions in some countries are also working together to produce rich supplementary sets of outcomes data on their graduates, though they may hesitate to release that information at the institutional level. But where institutions are best placed to act is, arguably, in ensuring that students are able to make good use of rich sets of information on graduate outcomes. They can, for instance, help students combine "standard" labour market data with additional information (e.g. about demand for transversal skills) that they gain from their engagement with alumni and employers. And through their networks, HEIs can support the exchange of information between students and these external partners.

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Introduction

Across the globe, substantial efforts have been made by policy makers to influence university governance. Two dominant arguments prevail in international research for understanding how policy shifts influence universities (see, for example, Amaral, Jones and Karseth, 2002; Amaral, Meek and Larsen, 2003; Amaral et al., 2009; Huisman, 2009; Paradeise et al., 2009). On the one hand, studies focus on the similarities of reforms and their similar influence on higher education institutions (HEIs) across countries. On the other hand, national path dependencies and reform trajectories are emphasised. However, such broad categories often obfuscate more than they shed light on how changes and shifts are actually played out inside HEIs. It is important to ask what the rationales for introducing the policies are; how HEIs have responded to the policies; and what the implications of the introduced policy changes at the university level are. In concrete terms, the focus of this chapter is a summary of the literature on policies aimed at changing institutional governance structures. The topic should be of interest to practitioners in higher education (leaders, teachers, and board members), policy makers and researchers, as a background for understanding the complex and sometimes seemingly contradictory changes in HEIs and systems.

Institutional governance structures can be seen as an umbrella term that 'refers to all relevant dimensions of the way HEIs are governed, for example, developments concerning the formal and informal institutional decision-making procedures and structures; changes in the composition, tasks and functioning of institutional governance bodies; and the growing involvement of external stakeholders in institutional governance issues' (Amaral and Maassen, 2002, p. xii). Institutional governance structures is a slippery term, that refers not only to formal *organisational* structures but also to these structures' *institutional* aspects, providing 'the central forum for the struggle over what these institutions are or should be, and the complex and evolving relationships between academics, students, and external interests' (Reed, Meek and Jones, 2002, p. xv).

Content of governance reforms

An extensive literature review indicates that national governance reforms and policy tools aimed at changing institutional governance structures vary largely (Frølich and Caspersen 2015). Nevertheless, governance reforms in higher education arguably share similarities in the sense that they focus on legal and financial policies and instruments, internal and external organisational changes in higher education, and the introduction of systems for accreditation and quality assurance. Bleiklie and Michelsen (2013) developed a conceptual framework for comparative analysis of higher education policies in Europe, partly through the TRUE-project (TRansforming Universities in Europe). Their assumption was that policy change in higher education may be better understood in terms of the structural characteristics through which policy processes take place. Their argument was that three major trends have characterized higher education policies since 1990: stronger institutional hierarchies, stronger interinstitutional networks and standardisation and formalization. It is possible to distinguish between public interest regimes (e.g. England), social democratic/ consensual regimes (e.g. Norway), Napoleonic regimes (e.g. France, Italy and Portugal) and *Rechtsstaat* regimes (rule of law; e.g. Germany, Switzerland and the Netherlands). Going

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back to the international research literature, the European politico-administrative regimes show some interesting features with regard to variation across Europe. Several studies concentrate on the Napoleonic regime, and some studies focused on reforms in the Scandinavian regime, the public interest regime and the *Rechtsstaat* regime. Moreover, only a few studies are comparative across regimes, and those studies include mostly data or research that allows only for comparison between the public interest regime and the *Rechtsstaat* regime. In Asia, privatisation and financial constraints seem to be the main types of policy reform tools.

What are the rationales for introducing policies aimed at restructuring institutional governance structures?

A univocal message in the research literature is that more or less similar drivers are described across regimes and systems. New managerialism, New Public Management, increased attention on accreditation and quality assurance – the labelling is slightly different, but points to the same mechanism across politico-administrative regimes (de Boer et al., 2010; Kretek et al., 2013; Taylor and Machado, 2008). In addition, de Boer et al. (2010) include the growing importance and influence of external stakeholders in higher education and the knowledge society in terms of rationales for governance reforms in the public interest regime and the *Rechtsstaat*. Other driving forces of university reforms are identified as global competition and the changed role of governing bodies (Christopher, 2012). Across European politico-administrative regimes, as well as around the world, reforms embedded in New Public Management are still seen as the main driver of institutional governance reforms in higher education. However, in South America, Africa and, to some extent Asia, the drivers of reforms appear to be more specifically related to the local political situation such as post-Mao China and the financial crisis in Argentina.

Lewis, Hendel and Kallsen (2007) and Deering and Sá (Deering & Sá, 2014) discuss the introduction of performance indicators in HEIs as a response to external changes in the United States and Canada. However, in the Canadian case, the changes are not directly linked to increased accountability, as is the case in the United States, but rather the consequence of decreased public funding. In the Canadian case, the introduction of incentive-based budgeting systems is an internal, strategic response to challenges, whereas in the United States case, the implementation of these systems is part of an accountability-enhancing strategy. Taylor and Machado (2006) also argued that the increased focus and attention on the role of governing boards in the United States must be interpreted within a state supervisory model, whereas challenges from NPM models of governance place not only pressure on autonomy but also emphasis on decreased direct government intervention. The underlying rationale is that any monopolization of power endangers the public good; thus, higher education is too important to society to be governed exclusively by the faculty.

How have higher education institutions responded to the policies?

Despite the differences in politico-administrative regimes, Kretek et al. (2013) managed to focus on the similarities across regimes regarding university responses. Formalization, standardisation and the strengthening of internal hierarchies as well as granting a strong position to chief executives and external board members, are common features across the regimes. However, governance practices depend on how board members enact their board member role (Kretek et al., 2013). University responses also depend on the traits characterizing the academic culture, such as the influence and resistance embedded in collegiality and the internal management culture (Christopher, 2012).

De Boer, Huisman and Meister-Scheytt (2010) examined governing boards across the Netherlands, Austria, and the United Kingdom. They found the main drivers of governance reforms to be NPM; stakeholders in society outside the universities, such as the public, the professions, and the market; and the increasing importance of universities in the knowledge society. The boards differ in their composition, independence, transparency, and accountability. The board composition in all three countries reveals that the board members belong to established networks (old boys' networks). The composition of the

Dutch and Austrian boards raises questions regarding the extent to which expertise and representativeness are well served; whereas in the United Kingdom, substantial consideration has already been given to balancing different types of expertise. The Austrian boards seem to be based on political steering in appointments and some of the Austrian and Dutch cases have strong linkages with business; both raise questions about the independence of boards. In Austria, the board is not accountable to anybody – not to the minister, not to the parliament, not to the university or its bodies, and in Netherlands the accountability relationships are primarily formal. By contrast, in the United Kingdom, accountability is addressed regarding both funding and transparency. The authors discussed the balance between composition, independence, transparency, and accountability, as well as the implications for the legitimacy and efficiency of the boards.

Literature emphasising differences argue that in the Scandinavian context, mergers have been an area of interest, while leadership practices have been more of interest in the public interest regime. Studies on strategies and middle managers have been conducted within the *Rechtsstaat* regime. Between the different regimes, different research approaches are emphasised, indicating that research approaches are naturally related to policy differences between regimes. The introduction and functions of governing boards are major themes when university responses are examined both in different European political-administrative regimes and in North America and Australia.

What are the implications of the introduced policy changes at the university level?

Regarding the implications of the institutional governance reforms, the research literature also points to similarities across regimes. Most higher education legislation across Europe provide for university boards with either external members only or a combination of internal and external members. A gradual strengthening of the power of these bodies can be observed. Alongside the strengthening of the power of university boards, there has been a rising voice of concern from students and the scientific community (Kretek et al., 2013). Across regimes, challenges exist with regard to striking a balance between market forces and the heritage of the academe and its values (Taylor and Machado, 2008). Within the public interest regime and the Rechtsstaat, the composition, transparency, accountability and independence of boards vary, and questions regarding their legitimacy have been raised (de Boer et al., 2010). The implications of the reforms seemingly depend on the mix of academic culture, autonomy and collegiality of individual universities.

Puusa and Kekäle (Puusa & Kekäle, 2013) (2013) investigated a merger process between two Finnish universities. The widespread rationale for mergers in higher education involves a maximisation of economies of scale and the hope of achieving administrative, economic, and academic benefits. The study suggested that the leadership of the merged university was weaker than the leadership of the two former universities, owing to the lack of time and grounding of the top-down administratively run merger process. However, the merged university seemed to have gained efficiency in administration and realised financial savings. Interestingly, the study found that despite resistance towards the merger, the academics became even more committed to their work and to their close colleagues during the merger process.

Geographical divisions or regime patterns – the interpretation of variations in institutional governance structures

Looking at the international research literature, it is interesting to reflect on whether geographical divisions or regime patterns are the most precise frame for interpretation. As stated in the introductory section of this chapter, previous studies have shown that two dominant perspectives on reforms prevail: reform similarities or national path dependencies. An alternative way to reflect upon geographical differences is to discuss to what extent changes in institutional governance structures are related to politico-administrative regimes. The structural characteristics in which policy processes take place could affect the governance reforms and, hence, the institutional governance structures.

Our broad outlook on the literature on institutional governance structures across European political regimes shows that the literature relates mainly to internal structures and organisation or to external structures and organisation. Only a few studies examine policy reforms from the perspective of the HEIs with regard to legal and financial reforms or evaluation and accreditation. The pattern also seems to hold for other geographical areas of the world. Furthermore, little attention has been given in the literature to university responses in the Napoleonic regime and in the continents of Africa and South America. The lack of studies from these areas reflects a publishing tradition related to a particular group of countries, as well as a particular research tradition with nodes and networks across them. Studies on institutional governance are mainly from English-speaking countries (the United Kingdom, the United States, and Australia). A final interesting note regarding the research literature is that only a small number of studies compare institutional governance across Europe and North America or across Europe, Australia and Asia. Moving the research in this direction would enhance the understanding of how regimes differ in their institutional governance structures.

Reform drivers and responses

A striking reflection is that little attention is given to the actual content of the reforms. The observed tendency is that drivers are only described as broader concepts of the reforms. Such vagueness might conceal specific peculiarities of more concrete reform packages. Without aiming to further explain the similarities and differences observed, we suggest – in line with Frølich and Sahlin (2013) – that reforms are themselves carriers of mixed and blended logics and ideas. They are carriers of ambiguous templates of institutional governance models. Reforms emerge from and carry new institutions; institutions mix and blend in the idiosyncratic organisational setting. The lack of precision in the discussion on new managerialism restrains more contextualised analysis of institutional governance structures.

Conclusion

As stated earlier, in higher education and public administration studies in general, two main arguments for understanding policy development, policy tools and institutional responses prevail. One line refers to the rapid spread of policies across the globe and emphasises policy borrowing and coping with policies. The other main argument repeatedly points out how national trajectories and path dependencies influence implementation processes, the choice and effectiveness of policy tools and the proposed policy solutions. When analysing institutional governance structures in a systematic way it is important to point out how institutional governance structures have been developed, implemented and responded around the globe. Such a lens should be used to highlight global similarities, as well as geographical differences. Moreover, through the lens of politico-administrative regimes, the similarities within Europe are still more evident than the differences. A possible interpretation is that national trajectories are perhaps less distinct than they previously were. Yet, clear differences in the scope and influence of the reforms around the world should not be understated, and this diversity should be examined and conceptualised in future research.

Looking beyond the scientific research community on higher education, the mapping of reform processes and drivers used as a background for this text also holds relevance for policy makers and practitioners. The insight that reforms and policy initiatives are carriers of mixed and blended logics and ideas has implications regarding the kinds of processes that can be anticipated to play out in times of change. Furthermore, the insight that many drivers and responses share similarities across politico-administrative regimes should serve as an invitation for institutional learning in new and inspiring ways. What at first may seem as "most different" may in a more focused lens be more similar than first imagined. Engaging with the down-on-the-ground variations in policy implementation and translation might push forward new initiatives and new opportunities for learning. However, in such processes it is equally important to also have a strong conceptualisation of differences, in order to delineate the important traits. It is through a fruitful dialogue between policy makers, researchers and practitioners that higher education

research can contribute with terminology and insight that truly highlights idiosyncrasies and commonalities between systems and settings.

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