

# Enhancing labour market relevance and outcomes of doctoral education: Country note Hungary

Employment outcomes for doctoral degree holders in Hungary are good, on average, but the system faces challenges in aligning labour market relevant supply and demand, in particular:

- Connections between doctoral degree programmes and the innovation ecosystem need to be increased.
- Academic staff involved in the design and delivery of doctoral degree programmes tend to have limited access to information on emerging demand for doctoral skills.
- The skills developed through doctoral degree programmes are not well understood by private sector employers.
- Enrolment in doctoral degree programmes in study fields with high labour market demand is low, and some fields of study suffer from low completion rates.

Analysis undertaken by the OECD project team, within the Labour Market Relevance and Outcomes of Higher Education Partnership Initiative, identified four priority areas for development: i) increasing the availability of labour market information for doctoral schools and doctoral students; ii) transferable skills development; iii) guiding student choice; iv) supporting doctoral students in completing their studies.

For each priority area, this country note reviews the system context, highlights challenges faced by institutions, lessons learned from current practice, and presents policy options for improvement. Annex B presents a self-reflection questionnaire for use by higher education institutions to identify strengths and weaknesses of current practice.

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## Aligning doctoral education with labour market developments in Hungary

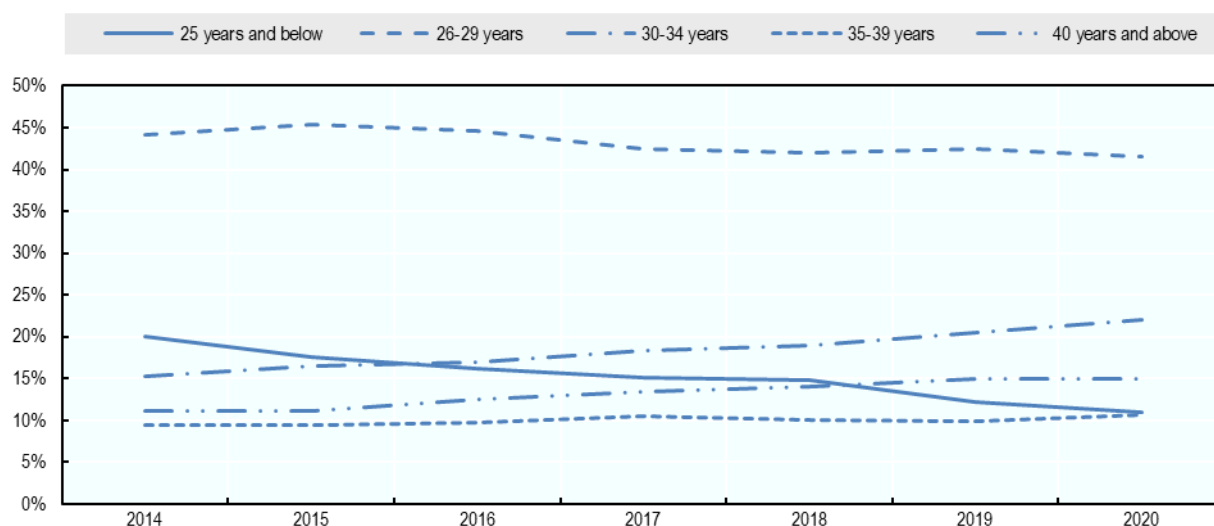
### Brief overview of doctoral degree education in Hungary

In Hungary, only universities are authorised to offer doctoral programmes and award doctoral degrees. Authorisation to deliver doctoral programmes is granted only if the university offers master's programmes in the same discipline.

In 2018, 6 414 students were enrolled in doctoral degree programmes across 28 universities in Hungary. The Eötvös Loránd University enrolls the largest number of doctoral students (1 336 in 2018), followed by the University of Pécs (805), the University of Szeged (735) and the University of Debrecen (651) (Hungarian Educational Authority, 2020<sup>[11]</sup>).

The majority of new entrants in doctoral degree programmes are in the 26-29 year-old age group (41% in 2020). These students are likely to have completed their master's degree and continue either directly into a doctoral degree programme or have some experience in the labour market. However, the largest increase over the period 2014-20 (18%) has been in the 30-34 year-old age group. The number of older students has also grown over time. The share of 35-39 year-olds was 11% and 15% for over 40 year-olds. This suggests a greater proportion of doctoral students that need to combine work, family and studies.

Figure 1. Distribution of new entrants in doctoral degrees by age (2014-20)



Source: Adapted from Hungarian Central Statistical Office (2020<sup>[21]</sup>), "Tertiary education. Technical identifier : HC1007".

### Typical structure of doctoral programmes

Responsibility for planning and organising doctoral programmes rests with doctoral schools operating within universities, with the exception of some regulated fields, such as medicine.

Doctoral programmes have 240 European Credit Transfer and Accumulation System (ECTS) credits and are organised into i) a study and research phase; and ii) a research and dissertation phase. Credits are awarded for courses, a comprehensive examination, academic research, publications and teaching in higher education. Applicants to doctoral degree programmes typically need to submit a research plan, including their research idea, methodology, timing and literature.

The study and research phase includes a minimum of 120 ECTS credits (typically two years full time) and ends with a comprehensive examination. After passing the comprehensive examination, the doctoral

candidate enters the research and dissertation phase, which consists of individual research work and ends with the public defence of the doctoral thesis. Doctoral candidates have three years to complete a doctoral programme. This can be extended for one year in justified cases, regulated by national law.

The study and research phase is not mandatory. It is also possible to prepare for a doctoral degree individually and informally. The prerequisites are a master's degree and fulfilling the admission requirements of the doctoral degree programme (Government of Hungary, 2011<sup>[3]</sup>).

#### *Requirements for the awarding of doctoral degrees*

Commonly, scientific publications in high-impact factor journals are a requirement for the awarding of a doctoral degree. In disciplines where there are not enough accessible internationally standardised publication opportunities for doctoral students, doctoral schools develop their own assessment criteria to evaluate the publication performance of doctoral students. These are similar to a publication index, but they also include presentations at conferences, articles in journals and technical translations etc.

Certification of foreign language skills is another condition for obtaining a doctoral degree. Skills must be sufficient in two foreign languages to perform academic activity in the given discipline. In the case of deaf students, one language may be a non-Hungarian sign language (Government of Hungary, 2011<sup>[3]</sup>).

#### *Accreditation of doctoral programmes*

Doctoral schools and doctoral degree programmes require accreditation by the Hungarian Accreditation Committee. In 2019, a new accreditation procedure replaced the earlier procedure of semi-annual reviews (Hungarian Accreditation Committee, 2020<sup>[4]</sup>). The new procedure focuses on the internal quality assurance activities of doctoral schools to determine their capacity for ensuring the quality of education, research and artistic activity. A pilot round with six doctoral schools was launched in October 2019. Site visit panels are composed of experts with experience in the academic profile of the school, leadership, quality assurance and the doctoral student perspective. The panel suggests three levels of accreditation: i) accredited for five years; ii) accredited for five years with a monitoring procedure; and iii) not accredited.

#### *The Hungarian Doctoral Council*

At the national level, the Hungarian Doctoral Council, whose members are the chairs of university doctoral councils, advises the government on different issues concerning doctoral schools. In 2019, it proposed the introduction of two quality targets: i) increase the completion rate of student satisfaction surveys among doctoral students to 80%; and ii) increase the availability of information on the doctoral school website in Hungarian and other languages (Hungarian Doctoral Council, 2019<sup>[5]</sup>). These criteria seek to address the high drop-out rates from doctoral programmes and the lack of information to guide study choice.

#### *Co-operative Doctoral Programme*

The government recently introduced the Co-operative Doctoral Programme, which aims to increase the collaboration between businesses and doctoral schools in doctoral degree education through a scholarship programme open to current and prospective doctoral students. Primarily supported fields of study are science, mathematics, engineering (STEM) fields and information technology. A national expert jury, with members from the higher education sector and industry, assesses applications.

Scholarship holders receive between net HUF 200 000 (around EUR 500) and net HUF 400 000 (around EUR 1 000) per month. Doctoral schools hosting co-operative doctoral students also receive up to gross HUF 2.5 million (around EUR 72 000) per semester for each doctoral student participating in the programme. Around 48% are to remunerate the thesis supervisor and the remainder is for project funding

per semester. The latter may only be spent on research, development and innovation activities or related infrastructure development, international networking, knowledge transfer or related services. In addition, the corporate experts who introduce the doctoral students to business operation and facilitate the business utilisation of their doctoral research also receive funding (NKFIH, 2021<sup>[6]</sup>).

For the time being, no distinction is made between research and co-operative doctorate degrees and traditional doctoral degrees. Some universities have raised the issue of formalising the distinction in the standards of programmes as well as in doctoral titles.

### ***Developments in research and development employment in Hungary***

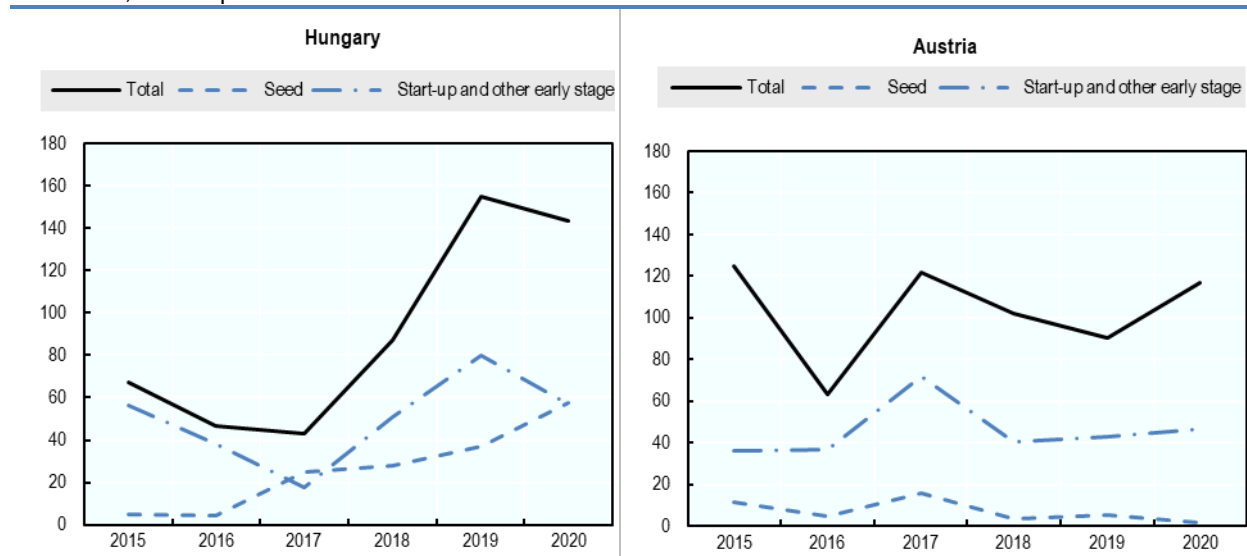
The Hungarian economy has experienced considerable growth over the last decade: pre-COVID-19, the country’s gross domestic product (GDP) rose on average 4% every year since 2014 (European Commission, 2020<sup>[7]</sup>). However, the country’s innovation capacity remains modest. Domestic companies mainly contribute to international production chains through low value-added assembly-type activities (European Commission, 2020<sup>[7]</sup>) and only a few large multinational companies have relocated their innovative activities to Hungary (Magyar Nemzeti Bank, 2019<sup>[8]</sup>). The government has introduced a number of stimuli measures for enterprises, including tax incentive schemes to promote research and development (R&D) employment and the reduction of compulsory social security contributions for highly skilled R&D employees (doctoral degree holders or doctoral candidates). The latest data available, however, suggests that the measures have been taken up by a smaller than expected number of enterprises (European Commission, 2016<sup>[9]</sup>).

#### *Start-up firms are gaining importance*

In Hungary, venture capital investment in start-ups and other early-stage ventures increased by 492% between 2010 and 2020. Investment in these businesses accounts for 40% of the total venture capital investment in the country, which grew from USD 24.973 million to USD 143.383 million (in current prices) over the same period. In comparison, the total venture capital investment in neighbouring Austria increased from USD 57.479 million in 2010 to USD 116.668 million in 2020 (OECD, 2022<sup>[10]</sup>).

**Figure 2. Venture capital investments in early-stage ventures in Hungary and Austria (2015-20)**

US Dollars, current prices



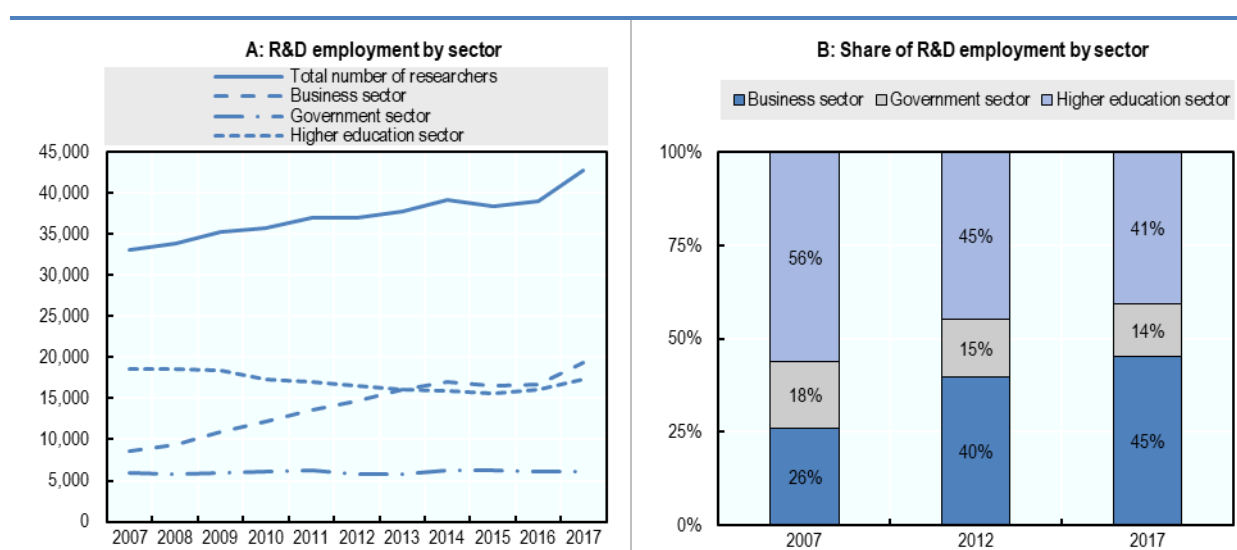
Source: Adapted from OECD (2022<sup>[10]</sup>), Enterprise Statistics (database) “Venture capital investments”, <http://dotstat.oecd.org/Index.aspx?QueryId=113904> (accessed on 16 May 2022).

The government seeks to increase connections between start-ups, the innovation ecosystem and doctoral schools to attract researchers from elsewhere in the country and overseas and to enhance the private sector employment prospects for doctoral degree holders.

*The number of researchers in the Hungarian economy is increasing*

The total number of researchers in the Hungarian economy increased by 29% between 2007 and 2017 (latest data available). The share of R&D employees in the business sector grew from 26% in 2007 to 45% in 2017, whereas it fell in higher education from 56% to 41% over the same period and is also decreasing in the government sector (Figure 3). The job-to-job mobility<sup>1</sup> of workers in science and technology, another indicator of labour demand, has been increasing both for the 25-34 year age group (from 22% in 2011 to 43% in 2020) and for the 34-45 year age group (from 16% in 2011 to 36% in 2020) (Eurostat, 2022<sub>[11]</sub>).

**Figure 3. Trends in R&D employment by sector 2007-17**



Source: OECD (2022<sub>[12]</sub>), Research and Development Statistics (database), “R&D personnel by sector and formal qualification”, <http://dotstat.oecd.org/Index.aspx?QueryId=83641> (accessed on 23 May 2022).

*However, R&D in businesses relies heavily on researchers with tertiary education lower than a doctoral degree*

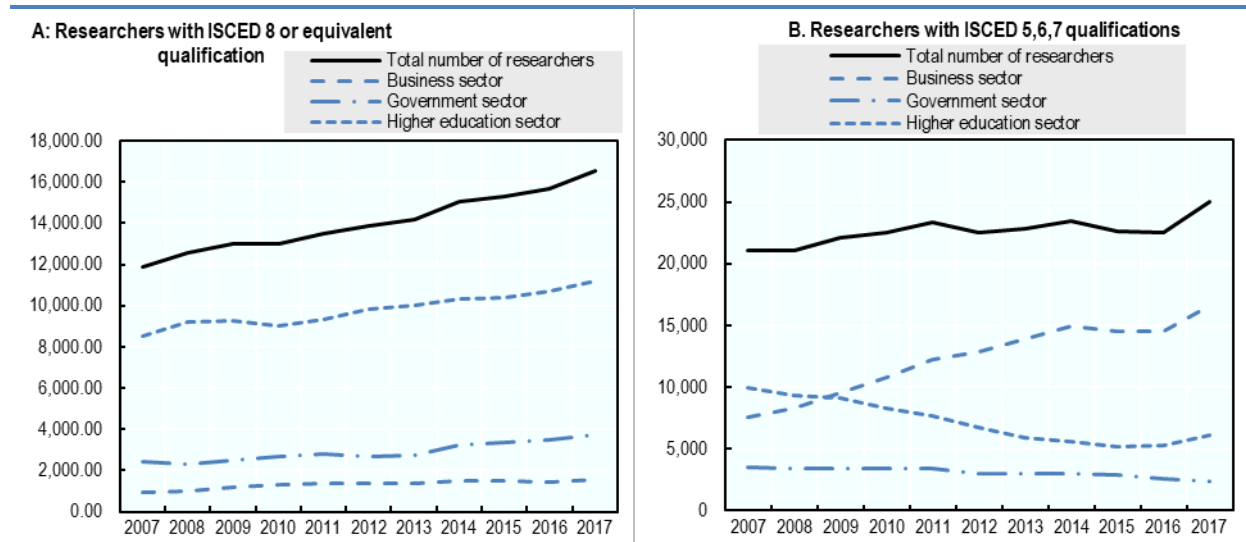
A large part of the R&D work in Hungarian businesses is carried out by researchers with tertiary education lower than a doctoral degree. The number of such researchers grew by 119% from 7 575 in 2007 to 16 552 in 2017 (Figure 4b).

This may change towards a greater share of doctoral degree holders employed in R&D positions in the business sector, as the number of researchers with a doctoral degree has also grown by 39% between 2007 and 2017 (Figure 4a). The largest increase is in the business sector with 65%, however total figures remain low with only 1 558 researchers in 2017. Still, the proportional increase is double that of researchers in higher education, numbers of which increased from 8 505 in 2007 to 11 225 in 2017 (32%). The second

<sup>1</sup> Job-to-job mobility is the movement of individuals between one job and another from one year to the next. It does not include inflows into the labour market from a situation of unemployment or inactivity. It is expressed as a proportion of the total number of workers in science and technology employed in a given year.

largest proportional increase is 53% for the government sector, from 2 434 researchers in 2007 to 3 723 in 2017.

**Figure 4. Research employees by qualification and sector of employment 2007-17**



Note: International Standard Classification of Education (ISCED) level 5 refers to short-cycle tertiary education; ISCED 6 to bachelor's or equivalent level, ISCED 7 to master's or equivalent level, and ISCED 8 to doctoral or equivalent level.

Source: Adapted from OECD (2022<sup>[12]</sup>), Research and Development Statistics (database), "R&D personnel by sector and formal qualification", <http://dotstat.oecd.org/Index.aspx?QueryId=83641> (accessed on 16 May 2022).

### *Employment opportunities in academia are decreasing*

Wage prospects and employment conditions in academia in Hungary are less attractive than for careers in the private sector. Among the issues frequently reported are low base salaries, temporary contracts and issues around the transparency of hiring at HEIs and public research organisations (Alpár et al., 2018<sup>[13]</sup>). As the interviewed leader of a doctoral school pointed out: "This leaves a vacuum; we need to train the next generation of scientists and for this we need to offer attractive employment opportunities."

The government expects that recently adopted legislation permitting universities to transfer from state entities to asset management foundations ("model change") will permit improvements to wage prospects and employment conditions for academic staff employed by newly-established foundations.

### *Second jobs are common among young researchers in academia*

In a recent national survey of early-stage researchers in academia, 42% of the respondents stated that they have a second job to make ends meet; this was slightly lower outside of Budapest. For those respondents with a second job, half undertake activities of a scientific-development nature (e.g. university, research, project work), 21% do other (non-research) industrial and market activities, and 19% carry out teaching activities (Alpár et al., 2018<sup>[13]</sup>).

## **Key challenges in aligning the supply and demand of doctoral degree holders in Hungary**

An initial analysis of labour market outcomes of doctoral education and stakeholder interviews, carried out between March and December 2020, identified five challenges for aligning the supply and demand of doctoral degree holders in Hungary.

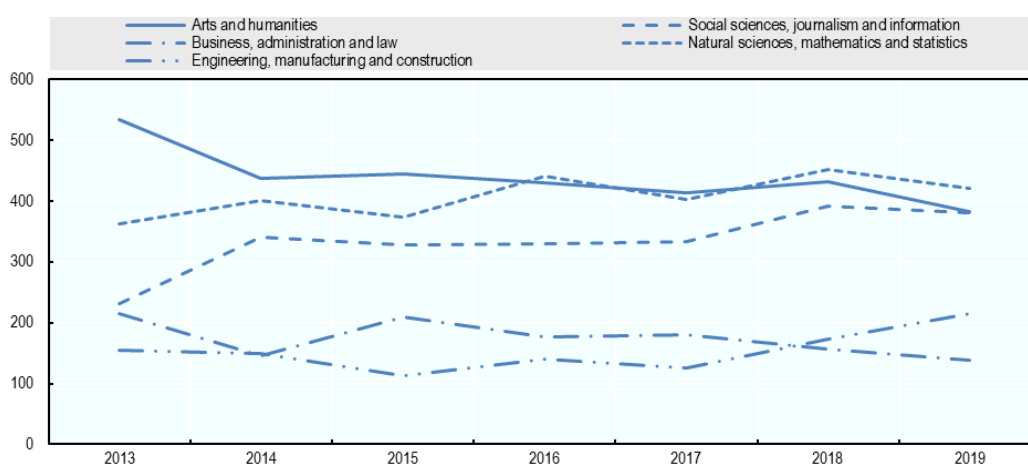
- Enrolment in doctoral degree programmes in study fields with high labour market demand is low.
- In some fields of study completion rates among doctoral candidates are low.
- The skills developed through doctoral degree programmes are not well understood by employers outside academia and public research organisations.
- Academic staff involved in the design and delivery of doctoral degree programmes tend to have limited access to information on emerging demand for skills and on the implications for doctoral training.
- Connections between doctoral degree programmes and the innovation ecosystem are weak.

These challenges are discussed in the following sections.

*Enrolment in doctoral degree programmes in study fields with high labour market demand is low*

The government seeks to steer study choice towards fields with high labour market demand through the allocation of state-funded study places. This has seen some success as enrolment rates in engineering have been increasing since 2017, while decreasing in Arts and Humanities (Figure 5). However, a key challenge in the system is the lack of systematic information on demand for doctoral skills outside academia, government and public research organisations.

**Figure 5. Enrolment trends in ISCED 8 programmes: new entrants in the top-five fields of study, 2013-19**



Source: OECD (n.d.<sup>[14]</sup>), OECD.Stat (database) “New entrants by field: Hungary – 2013”, <http://dotstat.oecd.org/Index.aspx?QueryId=112099> (accessed on 23 May 2022).

*Completion rates among doctoral candidates are low*

Data available for the project from 2013 points to a high drop-out rate: around 20% of candidates leave doctoral programmes during the study and research phase, around 60% pass the comprehensive exam and approximately 50% graduate (György, 2013<sup>[15]</sup>).

Non-completion varies by field of study. In the absence of more recent data for this project, a comparison of the proportion of doctoral degree graduates per year, out of the number of students enrolled, indicates that doctoral programmes in social and behavioural sciences and arts may suffer more from non-completion than other programmes (Table 1). However, also engineering, manufacturing and construction has a low ratio of graduates per year over students enrolled (14%), compared to health and welfare (19%) and natural sciences (18%).

**Table 1. Doctoral students and graduates per year, by field of study, average for 2005-19**

Field of Study	Students enrolled in ISCED 8, average 2005-19	ISCED 8 graduates per year, average 2005-19	Graduates per year / Students enrolled
Agriculture	373	51	14%
Arts	221	29	13%
Business and administration	267	40	15%
Computing	307	48	16%
Engineering, manufacturing and construction	713	98	14%
Health and welfare	1101	204	19%
Humanities	1308	220	17%
Law	441	70	16%
Science (Natural sciences)	1320	243	18%
Services	247	40	16%
Social and behavioural science	898	121	13%
Teacher training and education	304	47	15%

Note: The fields of study used by the Hungarian Accreditation Committee, the Hungarian Academy of Sciences and the Educational Authority are different to the international convention.

Source: Adapted from Hungarian Educational Authority (2020<sup>[11]</sup>). 3.1.9. Doktori (PhD, DLA, DOC) képzésben részt vevő hallgatók statisztikai száma az intézmény fenntartójának típusa, intézmények, karok és szakok szerint (Number of students in doctoral training by type of institution and study field), [https://www.oktatas.hu/felsooktatas/kozerdeku\\_adatok/felsooktatasi\\_adatok\\_kozzetetele/felsooktatasi\\_statisztikak](https://www.oktatas.hu/felsooktatas/kozerdeku_adatok/felsooktatasi_adatok_kozzetetele/felsooktatasi_statisztikak) (accessed on 11 March 2021).

### Many doctoral students need to combine study and work

The need to combine study and work is often mentioned as reason for low completion rates. State scholarships were increased in 2017 from HUF 100 000 (around EUR 280) per month to HUF 140 000 (EUR 400) per month during the first two years and HUF 180 000 (EUR 510) during the second two years. In addition, if students successfully obtain their doctoral degrees, they receive a sum of HUF 400 000 (EUR 1 140).

System-wide, less than 20% of enrolled doctoral students are state scholarship holders. In 2019, the annual number of state-funded places increased from 1 300 to 2 000 for around 6 400 enrolled doctoral students as per 2018. The share of state scholarship holders varies by doctoral school as data from the Eötvös Loránd University, the university with the largest share of doctoral degree students in Hungary, indicates (Table 2).

**Table 2. Share of state scholarships at Eötvös Loránd University 2018/19**

	Students	Share of state scholarships
Doctoral School in History	168	54%
Doctoral School in Biology	144	67%
Doctoral School in Linguistics	135	48%
Doctoral School in Educational Sciences	120	17%
Doctoral School in Literary and Cultural Studies	104	58%
Doctoral School in Psychology	97	42%
Doctoral School in Philosophy	86	58%
Doctoral School in Physics	76	61%
György Hevesy Doctoral School of Chemistry	75	56%
Doctoral School in Earth Sciences	71	65%
Doctoral School in Sociology	66	41%



	Students	Share of state scholarships
Doctoral School of Computer Science (Informatics)	66	42%
Doctoral School of Environmental Sciences	47	45%
Doctoral School in Mathematics and Computer Sciences (Mathematics)	39	79%
Doctoral School in Law and State Sciences	26	88%
Doctoral School in Political Sciences	16	44%
Total	1 336	52%

Source: Adapted from Hungarian Educational Authority (2020<sup>[11]</sup>), 3.1.9. Doktori (PhD, DLA, DOC) képzésben részt vevő hallgatók statisztikai száma az intézmény fenntartójának típusa, intézmények, karok és szakok szerint (Number of students in doctoral training by type of institution and study field), [https://www.oktatas.hu/felsooktatas/kozerdeku\\_adatok/felsooktatasi\\_adatok\\_kozzetetele/felsooktatasi\\_statisztikak](https://www.oktatas.hu/felsooktatas/kozerdeku_adatok/felsooktatasi_adatok_kozzetetele/felsooktatasi_statisztikak) (accessed on 11 March 2021).

### **Lack of flexibility to suspend studies and absence of information on future career prospects in and outside academia**

Another reason for attrition is the lack of flexibility to suspend studies and extend the study duration. Doctoral schools have the right to control the number of hours worked per week or month and also to prohibit scholarship holders' work engagements and there is little systematic support to help students who need to combine studies and work through greater flexibility.

Furthermore, doctoral students lack information on future career prospects in and outside academia. Having this information could help them to identify (additional) skills they need to develop as part of or in addition to their doctoral degree programme, and keep them motivated to complete their studies in light of the potential wage and employment premia for a completed degree.

*The skills developed through doctoral degree programmes are not well understood by employers outside academia and public research organisations*

On average, doctoral degree holders in Hungary have good labour market outcomes. In 2018, the employment rate of 25-34 year-old doctorate holders was 91%, 9 percentage points higher than that of young graduates with bachelor's degrees and 6 percentage points higher than for those with master's degrees (OECD, 2019<sup>[16]</sup>).

However, there is a lack of understanding of doctoral skills outside academia and public research organisations, and low absorptive capacity in the private sector. While the number of doctoral degree holders in the Hungarian business sector increased by 65% between 2007 and 2017, this was surpassed by the increase in the number of researchers with tertiary education lower than a doctoral degree (ISCED 5, 6 and 7), which grew by 119% (see Figure 4).

Doctoral degree programmes in Hungary are largely tailored towards careers in academia and public research organisations. At the same time, potential employers in the private sector expect doctoral degree holders to increase firm-level innovation and therefore require a mix of subject-specific and transferable skills applicable to a wide range of tasks and work settings.

For doctoral schools designing courses, developing this mix of skills can be challenging, as potential employers in the private sector may lack information on or not fully understand the skills developed through a doctoral degree programme. At the same time, doctoral schools and students lack systematic information on the skills needs of private sector employers, particularly in terms of transferable skills.

*Academic staff involved in the design and delivery of doctoral degree programmes tend to have limited access to information on emerging skills demand and the implications for doctoral training*

In some fields of study, it can be difficult for academic staff involved in the design and delivery of doctoral degree programmes to keep up-to-date with the latest developments in industry, which would give them access to information on emerging skills demand and the implications for doctoral training.

A commonly practiced mechanism to gain this information is temporary mobility between higher education and industry, which, however, is not encouraged or widely practiced in Hungary. Furthermore, there are no incentives, formal training for supervisors and other teaching staff in doctoral programmes to reflect labour market needs and demands for transferable skills in their teaching. Academics' salaries are low as is overhead project funding. As stakeholder interviews suggest, some supervisors may be frustrated by their supervisees having potentially better earning prospects.

*Weak connections between doctoral degree programmes and the innovation ecosystem*

Venture capital investments in Hungary have been growing at an impressive rate as the comparison with Austria shows, notably in early-stage ventures and seed investments (see Figure 2).

The government seeks to strengthen connections between the innovation ecosystem and doctoral schools and invests in building research and education-related bridges between technology transfer structures, start-up support services and doctoral degree programmes. The emphasis is on building structures that support long-term connections beyond project-specific collaboration, for example through the so-called Competence Centres, which have been established in several regions of the country. The aim is to enhance research excellence, create market-oriented research and development bases in HEIs, which provide corporate partners with a modern research background for the effective implementation of their development objectives. Participating universities are expected to create this structure with a clear mission to interact with private businesses and a managerial structure, which gives it a closer organisational set-up to businesses. Similarly, the government seeks to stimulate connections through geographical proximity with funding for the creation and expansion of science parks.

While this and other national initiatives such as the Competence Centres and the Co-operative Doctoral Programme have at least prompted a debate on how to enhance connections between doctoral schools and the innovation ecosystem, they have not been combined into a comprehensive approach. Rigorous evaluations of the different initiatives are needed to identify areas for improvement and upscaling. As one of the interviewed leaders of a doctoral programme in natural sciences noted: "The main problem is not the doctoral schools. They are not resisting connections with industry. These projects bring money. The problem is that there are not many industrial partners that are interested in this collaboration. Their approach is 'We finance what we need and we buy if we are interested'; they are not interested in high-level training."

An area that could benefit from a more comprehensive approach is the development of transdisciplinary research that integrates both academic researchers from unrelated disciplines and non-academic participants (OECD, 2020<sup>[17]</sup>). As the head of one technology centre pointed out: "We need more room to improve collaboration. Thinking in teams is a key transferable skill and there are other key skills related to interdisciplinarity, but we have no mechanisms to enhance it."

## Priority areas for policy and practice development to enhance the labour market relevance and outcomes of doctoral education in Hungary

The challenges identified from the analysis of labour market outcomes of doctoral degree holders point to four priority areas for policy and practice development that have the potential to enhance the labour market relevance and outcomes of higher education.

1. increasing the availability of labour market information for doctoral schools and doctoral students;
2. developing transferable skills of doctoral degree holders;
3. guiding student choice;
4. supporting doctoral students in completing their studies.

For each priority area, the higher education system context is briefly analysed, highlighting challenges that universities in Hungary face. This is followed by a discussion of what can be learned from current institutional practice and what HEIs can do to upscale current practice. Finally, a set of policy options are presented to support the alignment between doctoral degree education and the labour market for graduate skills outside academia.

The policy options were developed following initial analysis carried out by the OECD review team between January and December 2020 on labour market outcomes experienced by graduates and employers and potential drivers and barriers affecting these outcomes. Further evidence was collected during peer-learning activities, organised between January and December 2021, both within the country and across the four countries, involving HEIs and higher education policy stakeholders.

## Summary of key findings and policy options

**Table 3. Summary of key findings and policy options**

Priority areas for policy and practice development	Higher education system context and challenges for HEIs	What can be learned from current institutional practices?	Policy options
Increasing the availability of labour market information for doctoral schools and doctoral students	<ul style="list-style-type: none"> <li>• Doctoral schools lack up-to-date system-wide information on the employment outcomes of doctoral degree holders, and information on private sector demand for doctoral-level skills is not available to doctoral schools, hindering career guidance and updating of the course offer</li> </ul>	<ul style="list-style-type: none"> <li>• Some universities successfully use strategic co-operation with businesses to learn about emerging skills needs and to communicate the value of doctoral degree skills to enterprises</li> <li>• Several universities use alumni platforms to collect and disseminate information on typical and non-typical careers of doctoral degree holders</li> </ul>	<ul style="list-style-type: none"> <li>• Close the data and information gap on the labour market outcomes of doctoral degree holders with a graduate tracking survey, and an analysis of job posting data to assess the demand for doctoral skills in the private sector</li> </ul>
Developing transferable skills of doctoral degree holders	<ul style="list-style-type: none"> <li>• There is a lack of understanding of doctoral skills outside academia and public research organisations, and low absorptive capacity in the private sector</li> <li>• Doctoral schools have a high degree of autonomy but lack support for the development of transferable skills as part of doctoral degree programmes</li> <li>• The absence of national flagship research areas keeps collaborative research efforts small-scale and co-ordinated</li> </ul>	<ul style="list-style-type: none"> <li>• In some universities, technology transfer offices are effective in bridging doctoral schools' and enterprises' diverging views of doctoral graduate skills, and creating an appreciation of doctoral skills to enterprise needs, and vice versa</li> <li>• Doctoral schools have successfully emphasised the role of research groups for transferable skills development</li> </ul>	<ul style="list-style-type: none"> <li>• Support doctoral schools to introduce transferable skills as part of their programmes</li> <li>• Stimulate the emergence of national flagship research areas to increase collaborative research, involving multiple universities, public research organisations and private sector</li> </ul>

Priority areas for policy and practice development	Higher education system context and challenges for HEIs	What can be learned from current institutional practices?	Policy options
Guiding student choice	<ul style="list-style-type: none"> <li>Prospective doctoral students lack comparative information on retention/attrition rates and career prospects to guide their choices</li> </ul>	<ul style="list-style-type: none"> <li>Information events for prospective doctoral students with recent graduates help to guide student choice</li> </ul>	<ul style="list-style-type: none"> <li>Further develop study guidance with a single, easily accessible and user-friendly web portal with study and labour market information for prospective doctoral students</li> </ul>
Supporting doctoral students in completing their studies	<ul style="list-style-type: none"> <li>In some fields of study attrition rates are high, and universities lack data to systematically identify and support students at risk of attrition from doctoral studies</li> <li>In addition to the need to combine study and work, common risks for attrition are social isolation, conflicts with supervisors, and the lack of support to perform teaching duties</li> <li>Universities offer mental health support, but a more proactive approach could be considered to raise doctoral students' awareness of attrition risks and existing support</li> </ul>	<ul style="list-style-type: none"> <li>Research groups are highly valued by doctoral students for their peer connections and learning through observation, and doctoral schools can do more to ensure participation opportunities are available to all doctoral students</li> </ul>	<ul style="list-style-type: none"> <li>Support the development of a student monitoring system to design inclusive student support services</li> </ul>

## 1. Increasing the availability of labour market information for doctoral schools

### *Higher education system context and challenges for HEIs*

**Doctoral schools lack up-to-date system-wide information on the employment outcomes of doctoral degree holders, and information on private sector demand for doctoral-level skills is not available to doctoral schools, hindering career guidance and updating of the course offer**

Doctoral schools and university leadership in Hungary lack up-to-date system-wide information on the employment outcomes of doctoral degree holders. In part, this is the reason why doctoral education continues to be largely oriented towards future careers in academia and public research organisations.

The existing national graduate survey does not cover doctoral degree holders and there are no specific employer surveys on emerging needs for doctoral-level skills. To address this systemic information gap, doctoral schools use their regular contacts with employers, often organised directly by faculties/departments, programme co-ordinators or supervisors, to gain insights into demand for emerging skills needs. However, the available information risks remaining isolated and not used for career guidance or updating the course offer.

University central-level structures that deal with labour market information do exist, for example quality assurance units and career centres, but they are not tasked with the collection of information that could be used by doctoral schools or faculties to review and update the curricula of the education and research phase of doctoral programmes. Furthermore, some of the doctoral schools are too small and lack the resources and organisational capacity.

The survey of current institutional practice and medium-term priorities carried out for this project showed that half of the surveyed universities (50%) reported having institution-wide practices in place to monitor and ensure the relevance of the educational offer to evolving labour market needs (Figure 7, Annex A). This was more common in smaller institutions, i.e. universities with 200 or less students in doctoral

programmes (75%) (Figure 8, Annex A), whereas it was a medium-term priority for 60% of the surveyed larger universities with over 200 doctoral students (Figure 9, Annex A).

*What can be learned from current institutional practice?*

**Some universities successfully use strategic co-operation with businesses to learn about emerging skills needs and to communicate the value of doctoral degree skills to enterprises**

The analysis of case studies and interviews showed that universities with close and active connections with their innovation ecosystem use technology transfer offices, spin-offs and research collaboration partners to identify emerging skills needs. Interview partners referred to these as two-way communication channels. Triggered by the business's interest in the research capacity and human resources of the university, these channels provide information on skills needs of innovative companies. Universities also organise regular science fairs for businesses, regional and sector-specific innovation fairs, often using their alumni network to increase company participation, to promote the value of doctoral graduates to nascent innovator firms.

All four universities visited have central-level offices to support this development. The case studies and interviews showed that a key success factor for the establishment of these offices is building on national guidelines and policy measures to create incentives and generate commitment among staff and doctoral students to head in new directions. The central-level offices “function in between a bottom-up and a top-down approach” approach, one interviewee pointed out. The long-term aim is to establish structures that can help in advancing institutional flagship research areas.

**Several universities use alumni platforms to collect and disseminate information on typical and non-typical careers of doctoral degree holders**

Alumni can provide highly valuable labour market information for current students. Several universities in Hungary have used the recent government investment in digitalisation in higher education to upgrade their relationships with alumni, creating online alumni platforms with mentoring functions and research sections to match supply and demand. One interviewee highlighted that “within a couple of months we have registered 3 000 potential mentors, before we had 1 800. Also, our former doctoral students have started to use the tool, we have now 82 users with a PhD of which 32 would like to be mentors.” Another advantage of online platforms is that they can work in multiple languages.

In one focus group, leaders of career services noted that alumni can be particularly helpful for doctoral students in Arts and Humanities, who are often highly focused on career aspirations in academia. As one interviewee pointed out: “I think they are afraid to apply for a job outside academia. Alumni can help them, through their own experience, understand how to react when a company says ‘you are overeducated, we want someone with practical experience and not only academic’. Alumni can help them to understand how their skills are transferable.”

*Policy options*

**Close the data and information gap on the labour market outcomes of doctoral degree holders with a graduate tracking survey and an analysis of job posting data to assess the demand for doctoral skills in the private sector**

A double approach is required to closing the data and information gap on the labour market outcomes of doctoral degree holders and private sector demand for doctoral skills, with both a national survey and programme-level efforts. In this way, the existing communication channels with innovative companies and

nascent innovator firms could be scaled up. Doctoral schools could consider a sector-wide collaboration on doctoral degree holders and companies related to their programme, potentially including neighbouring jurisdictions and countries to reach a critical mass. To assess the demand for doctoral degree holders in parts or across the Hungarian economy, public authorities could consider carrying out a study using job posting data.

An example of a national survey of doctorate careers, with a particular focus on the non-academic labour market, is the DocEnhance career tracking survey (DocEnhance, 2022<sup>[18]</sup>). DocEnhance is a project funded by the European Commission for the period 2020-22 that seeks to achieve the development of courses for transferable skills, and their integration into doctoral degree programmes. The international consortium includes 18 universities across Europe and one African university. The survey includes 60-70 questions divided into eight sections (doctoral education, skills, transition to first/next employment, employment and career-related experience, inter-sectoral and geographical mobility and demographic details).

Another example is the “KaWuM – Career Paths and Qualification Requirements in Science and Higher Education Management” project funded by the federal German government. The three-year project (2019-22) has a total funding of approximately EUR 700 000 and seeks to identify patterns that can be used to upgrade course curricula by looking at which pathways science managers follow to get to their jobs and what transferable skills were most in demand for hiring and career advancement. KaWuM collects quantitative and qualitative data on career paths, competencies, qualifications, perceived professionalisation tendencies and organisational development (KaWuM, 2022<sup>[19]</sup>).

## **2. Developing transferable skills of doctoral degree holders**

### *Higher education system context and challenges for HEIs*

#### **There is a lack of understanding of doctoral skills outside academia and public research organisations, and low absorptive capacity in the private sector**

While the number of doctoral degree holders in the Hungarian business sector increased by 65% between 2007 and 2017, this was surpassed by the increase in the number of researchers with tertiary education lower than a doctoral degree (ISCED 5, 6 and 7), which grew by 119% (Figure 4). Stakeholder interviews pointed to the lack of understanding of the value of doctoral skills outside academia and public research organisations. In academia, journal articles and other research achievements signal key doctoral degree skills, implicitly also underlying transferable skills. These skills-signalling mechanisms also have an effect on businesses that traditionally hire doctoral degree holders, e.g. international companies and academic spin-offs. The question is how to signal the value of doctoral skills to innovative companies and nascent innovator firms whose management does not have experience in doctoral education.

One way could be for doctoral schools to make greater use of research collaboration with (potential) employers to build a common understanding of graduate skills and create trusted mechanisms for students to signal their skills. This is currently not widely practiced among Hungarian universities. The institutional survey showed that 25% of the universities with 200 or less doctoral students had institution-wide practices in place (Figure 8, Annex A). Across all surveyed universities, 39% had no or limited activities (Figure 7, Annex A). This may increase in the medium term as 40% of the surveyed universities with more than 200 students and 38% of the smaller universities stated that collaboration with employers to build a common understanding of graduate skills is a development priority for the next two to three years (Figure 9, Annex A).

The National Association of Doctoral Students has been active in this area and seeks to strengthen the connections between doctoral education and the Hungarian economy through the Young Expert System, which connects young researchers with companies for small research and consulting projects (Box 1).

### Box 1. Young Expert System

The Young Expert System (*Fiatal Szakértői Rendszer*) was established in 2019, just before the COVID-19 pandemic. The aim is to provide young researchers with opportunities to connect with the private sector by supporting the activities of businesses professionally and scientifically. The Young Expert System manages the implementation of the research projects, including administration and communication, so the experts only have to deal with the professional implementation, providing the client with the finished work in a publishable format.

By spring 2020, it had more than 700 people in the database and 57 completed projects. A close partner of the Young Expert System is the National Association of Doctoral Students.

Source: Presentation of the Young Expert System in the 3<sup>rd</sup> international peer-learning seminar of the LMRO Partnership Initiative. Website: <https://hunexpert.hu/> (accessed on 11 March 2021).

### **Doctoral schools have a high degree of autonomy but lack support for the development of transferable skills as part of doctoral degree programmes**

Doctoral schools have a high degree of autonomy in the design and delivery of doctoral degree programmes but, as underlined in the interviews, there is a lack of support for the development of transferable skills as part of doctoral degree programmes. As one of the interviewed doctoral school leaders pointed out: “Soft skills development happens through supervisors, and accidentally”.

Support often comes with rewards and incentives for innovative practices. A policy priority area for Hungary is to enhance innovative approaches to teaching and learning in higher education. As noted by one interviewed senior university management representative: “We are missing an objective evaluation system of all actors. We need straightforward principles. Such as the DORA Declaration of Research Assessment. We need to evaluate the supervisors and the doctoral schools.”

A main barrier seems to be the lack of incentives for doctoral schools to review their educational offer for the study and research phase to include the development of transferable skills. Currently, less than one-third (28%) of the surveyed universities reported to have institution-wide practices in place to use teaching practices, learning environments and assessment methods to equip students with skills valued by employers, including skills that are applicable to a wide range of tasks and work settings (i.e. transferable skills). Even less (22%) reported to have institution-wide practices to support teaching staff in staying current with innovation and societal challenges linked to their discipline, and to reflect this in their teaching (Figure 8, Annex A). While there seems to be no change to support provided to the teaching staff in the medium term, innovation in teaching methods is the highest ranked development priority for the surveyed universities over the next two to three years (Figure 9, Annex A).

### **The absence of national flagship research areas keeps collaborative research efforts small-scale and lacking in co-ordination**

The participation of Hungarian scientists in international research collaborations, and European co-funded projects have helped advance research collaboration involving multiple universities and public research organisations. However, this development has not yet been acted upon by higher education and science policy makers in Hungary, who have not engaged in in-depth reflections and discussions to define national flagship research areas to guide the allocation of research funding and public investment to stimulate collaborative research efforts.

Collaborative research efforts involving universities, other research-performing higher education institutions, public and private research organisations and the Hungarian Academy of Sciences, including

the Eötvös Loránd Research Network are still small-scale and lack co-ordination (European Commission, 2016<sup>[9]</sup>). The lack of national flagship research areas also limits the possibilities for doctoral students to collaborate on related research topics across different doctoral schools.

*What can be learned from current institutional practice?*

**In some universities, technology transfer offices are effective in bridging diverging views of doctoral graduate skills between doctoral schools and enterprises, and creating an appreciation of doctoral skills to enterprise needs, and vice versa**

The analysis of case studies and interviews showed that in some universities the technology transfer offices act as effective multi-stakeholder platforms for the promotion of inter- and transdisciplinary research and related skills. By hosting cross-disciplinary research breakfasts, technology transfer centres can support doctoral students to start building a research community, as not all doctoral schools provide physical spaces to meet and not all doctoral students have the opportunity to participate in a research group.

Technology transfer centres also have a leading role in supporting the development of entrepreneurship skills and new venture creation (OECD/European Union, 2017<sup>[20]</sup>). Doctoral students are, for example, involved in the preparation of knowledge maps that seek to assess the potential value of research. Several doctoral programmes include a course on intellectual property rights, but a greater coverage and more focus on the topic and practical guidelines (e.g. handbook, FAQ) are needed to allow researchers to develop both a basic and discipline-specific understanding.

Technology transfer offices can also play a role in bridging doctoral schools' (and academia in general) and enterprises' diverging views on doctoral graduate skills. In simplified terms, the university view is that the private sector and academia have the same skill requirements of doctoral degree graduates. Whereas businesses expect doctoral graduates to have leadership skills, to be able to scout for patentable research and write patents, and to understand and handle data security.

- **Leadership skills.** As one representative of a multinational company pointed out: "We expect doctoral students to become the technical leaders and the architects of new solutions. We expect, from collaboration with universities, to build the research community around specific topics and we want to support universities to become world leaders in this."
- **Scouting for patentable research.** Another representative of a multinational company noted: "What is missing is the capability to write a patent; understanding a patentable object and then writing the technical description, that is, the ability to spot what can be patented."
- **Understanding and handling data security.** One representative of a Hungarian high-tech company underlined: "Artificial intelligence is a good example. We have to share sensitive personal data to develop it. This is anonymised data but there is information that needs to be safeguarded and there is no proper way to do this. We have to solve it somehow."

Technology transfer offices can also provide doctoral students with an increased level of credibility in the relationship with businesses. As one of the doctoral school leaders noted: "Companies will not speak to the students, they will only speak to the supervisor. Industry is not ready for this. The industry partner will not discuss serious problems with students. But this is exactly the kind of knowledge transfer we need."

**Doctoral schools have successfully emphasised the role of research groups for transferable skills development**

Supervisors play a significant role in the research life of doctoral students. The analysis of interviews and case studies showed that doctoral schools in Hungary have come up with several approaches to complement the role of supervisors and to build in elements of reflection in addition to observation to



enhance the development of research skills. For example, reflection in research groups on the skills development component of participation in third-party funded research projects and teaching duties, and writing mock-up project proposals and patent applications as part of the comprehensive exam.

### *Policy options*

Doctoral education in Hungary risks trailing behind global developments due to a number of missed opportunities. A policy response to this would be supporting universities to introduce transferable skills development as part of their doctoral degree education, and to stimulate the emergence of national flagship research areas to stimulate collaborative research efforts.

#### **Support doctoral schools to introduce transferable skills as part of their programmes, for example through a community of practice which shares good practices**

Public authorities in Hungary could stimulate this through support for the development of a community of practice that shares good practice on the cultivation of transferable skills as part of doctoral degree programmes. A relevant learning model for the introduction of transferable skills as part of doctoral degree programmes is the Researcher Development Framework (RDF) developed in 2009 by Vitae, part of the Career Research and Advisory Centre in the UK (Vitae, n.d.<sup>[21]</sup>);<sup>2</sup>

The RDF describes the knowledge, intellectual abilities, techniques and professional standards needed to do research, as well as the personal qualities, knowledge and skills required to work with others and ensure the wider impact of research. The RDF maps researcher competencies (characteristics, skills, knowledge, behaviours and attributes) across four domains, providing a holistic view of how to develop effective researchers: i) knowledge and intellectual abilities; ii) personal effectiveness; iii) research governance and organisation; and iv) engagement, influence and impact. It is the framework for planning, promoting and supporting the personal, professional and career development of researchers. On an individual level, researchers can map their competencies to the RDF in a way that draws out their current strengths as well as their areas for development.

The RDF is an internationally recognised route map and language for the professional development of researchers. The RDF is used in over 160 HEIs in the UK and in almost 200 HEIs globally in 20 different countries. For policy makers and research funders, it provides a common understanding of the competencies of effective researchers. It also provides a universal language that researchers can use to recognise and describe their competencies in a language that may be widely understood.

The RDF also facilitates researcher mobility across sectors and internationally. Institutions and staff supporting researchers use the RDF to underpin their career and professional development provision for researchers, meaning that individual researchers can move more easily between institutions as they share a common underlying framework.

#### **Stimulate the emergence of national flagship research areas involving multiple universities and public research organisations to increase collaborative research, involving multiple universities and public research organisations and the private sector**

The participation of Hungarian scientists in international research collaborations, and European co-funded projects have helped advance research collaboration involving multiple universities and public research organisations. This could be systematically supported through national flagship research areas involving

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<sup>2</sup> For a brief description of the Researcher Development Framework, see Seminar Brochure “**Stimulating innovation through inter- and trans-disciplinarity in education and research**” at <https://www.oecd.org/education/higher-education-policy/>.

multiple universities and public research organisations and private sector. National flagship research areas also provide opportunities for doctoral students to collaborate on related research topics across disciplines and universities.

A relevant learning model to stimulate the emergence of national flagship research areas to enhance co-ordination and collaboration across the sector involving multiple universities and public research organisations could be the research prioritisation exercise in Ireland (Department of Enterprise, Trade and Employment of Ireland, 2018<sup>[22]</sup>). The research prioritisation exercise started in 2012, post financial crisis, when a significant focus was on economic recovery and employment growth, and major-scale investment in R&D was relatively recent. Since then, the aim has been to create research activities of critical mass with the commitment to reviewing the priority areas to ensure their relevance and to revise them, if necessary, in the light of changed circumstances. The government has commissioned reports to inform the review of priority areas, including a scan of global markets; a technology futures exercise; and an audit of progress under the current priority areas. The most recent review identified six priority areas: i) information and communications technology (ICT); ii) health and wellbeing; iii) food; iv) energy, climate action and sustainability; v) manufacturing and materials; and iv) services and business processes. The proposed areas are broad enough to involve the full continuum of research – from basic through to applied – and could involve researchers across all disciplines including arts, humanities and the social sciences, as well as science, technology, engineering and maths, and foresee scholarships for doctoral students and post-doc positions.

### 3. Guiding student choice

#### *Higher education system context and challenges for HEIs*

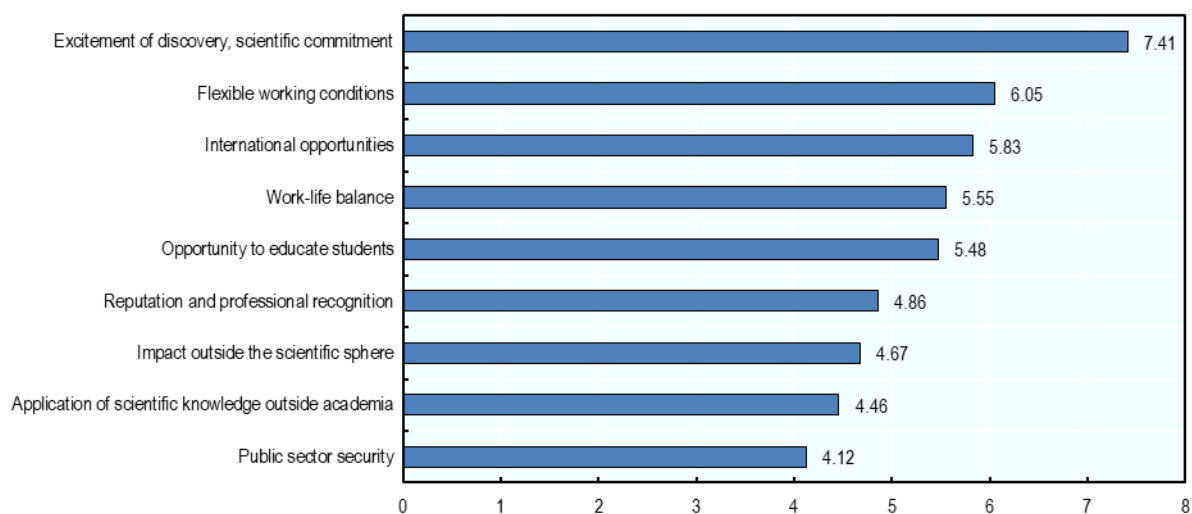
##### **Prospective doctoral students lack comparative information on retention/attrition rates and career prospects to guide their choices**

In Hungary, prospective doctoral students lack comparative information on completion rates, time-to-degree and retention/attrition statistics, which makes it difficult to estimate their own potential of completion.

The lack of information for prospective doctoral students is not yet widely recognised as a barrier to study guidance. Stakeholder interviews revealed that the common understanding is that most doctoral students seek future employment in academia. The underlying assumption is that many doctoral students have been predominantly guided in their choice by their quest for knowledge and their interest in the scientific method. For many, these are significant motivations as a recent survey of Hungarian doctoral degree holders aged 45 years or below, working in academia or public research organisations shows (Alpár et al., 2018<sup>[13]</sup>). Most important for their decision was the excitement of discovery and scientific commitment and least important was the public sector employment prospect (see Figure 6).

However, this view does not take into account that the career preferences of individuals change over time and that a range of psychological, sociological, and economic factors influence doctoral students in their choice of employment sector. While the preference for an academic career may not have changed, students' expectations of being able to obtain a position may have. Insights into working conditions, funding acquisition and management can discourage students from pursuing academic careers. However, doctoral students in Hungary do not have this information in a structured, reliable and up-to-date format. Full-time doctoral students, who are not working, have very little contact with the private sector. This is different for Co-operative Doctoral Programme students, but they are a minority (and stay largely among themselves).

Figure 6. Motivations for commencing an academic career in Hungary (2018)



Note: Responses from 1 535 doctoral degree holders aged 45 years or below, working in academia or public research organisations. Respondents were from the following disciplines, defined by the European Research Council: 32.8% Life sciences; 36.2% Social sciences and humanities; 31.1% Physics and technical sciences. Survey period: March-April 2018. Likert scale 1: not important to 8: very important. Source: Alpár et al. (2018<sup>[13]</sup>), "Fiatal kutatók Magyarországon. Felmérés a 45 év alatti kutatók helyzetéről, karrierterveiről, nehézségeiről" [Young researchers in Hungary. Survey on the situation, career plans and difficulties of researchers under 45], [https://mta.hu/data/dokumentumok/fiatal\\_kutato\\_khelyzete\\_felmeres\\_eredmeny.pdf](https://mta.hu/data/dokumentumok/fiatal_kutato_khelyzete_felmeres_eredmeny.pdf).

Career guidance in Hungary's universities is largely oriented towards students in bachelor's and master's programmes. Interviewed managers of career guidance services pointed out that COVID-19 triggered an increased interest in university careers services among doctoral students, and that their aim is to build on this with a more tailored offer for doctoral students

Overall, the use of labour market information to guide student choice is not widely practiced by universities. Less than one-third (28%) of the surveyed universities reported to have institution-wide activities to use labour market information to guide study choices and career decisions (Figure 7, Annex A). This was more common in universities with more than 200 doctoral students (40%) (Figure 8, Annex A), whereas for half of the smaller universities (50%) this was a medium-term development priority (Figure 9, Annex A).

Moreover, public websites providing labour market information to guide student choice do not include information on doctoral degree holders and research careers outside academia and public research organisations.

*What can be learned from current institutional practice?*

### **Information events for prospective doctoral students with recent graduates have the potential to guide student choice**

During the Covid-19 pandemic, the National Association of Doctoral Students started an online information event for prospective doctoral students. The event reached a large number of students and stimulated efforts to prepare a similar event for an international audience. This is an important step towards greater availability of comparative information to support prospective doctoral students in their choices. The university chapters of the National Doctoral Student Association provide information in a discipline/programme-specific format, not in a comparable format.

The survey of current practices and institutional priorities carried out as part of the project showed that only 17% of the surveyed universities had institution-wide practices in place supporting students to enrol and succeed in study programmes with high labour demand. (Figure 7, Annex A). Institution-wide practices were more common in large universities with more than 200 students in doctoral education (30%) (Figure 8, Annex A). Directing students towards programmes with high labour market demand is not a medium-term development priority for any of the surveyed universities (Figure 9, Annex A).

### *Policy options*

#### **Further develop study guidance with a single, easily accessible and user-friendly web portal with study and labour market information for prospective doctoral students**

Information on completion rates, time-to-degree, retention/attrition statistics and careers inside and outside academia would help prospective doctoral students with their study choices. A learning model could be Studiekeuze123 in the Netherlands, a website that displays detailed information on studies and courses across all levels of higher education, including doctoral degree programmes (Studiekeuze123, 2022<sup>[23]</sup>). Studiekeuze123 offers tools to compare courses and programmes. Users can select their favourites and compare them based on multiple features. The labour market information displayed is tailored to the level of study preselected by the user.

## **4. Supporting doctoral students in completing their studies**

### *Higher education system context and policy rationale*

#### **In some fields of study attrition rates are high, and universities lack data to systematically identify and support students at risk of attrition from doctoral studies**

Attrition from doctoral programmes is a common challenge for doctoral schools in Hungary. Data available for the project points to a high drop-out rate: around 20% of candidates leave their doctoral programmes during the study and research phase, around 60% pass the comprehensive exam and approximately 50% graduate (György, 2013<sup>[15]</sup>). Direct pathways into doctoral studies are common and doctoral students often remain at the same university where they completed their master's degree. The advantage of staying in one field, according to the interviewed students, is that the student already knows the supervisor. Supervisors play a key role in the definition of research topics. Prospective students need to choose one of the published research topics on the National Doctoral Council's website, the Hungarian Doctoral Database, when applying for a study place. Changing a research topic is a cumbersome process with a high risk of attrition.

A related aspect covered in the institutional survey is the flexibility of doctoral programmes. Of the surveyed universities, 63% of the smaller universities, with 200 or less doctoral students, had institution-wide practices in place for adapting curricula, the mix and flexibility of programmes (Figure 8, Annex A). For smaller universities this was also the highest ranked medium-term development priority (Figure 9, Annex A).

Universities lack data to identify students at risk of attrition. Doctoral school leadership reported that there is some information on when students risk attrition, for example based on their personal circumstances or programme characteristics, but this is not used systematically to identify students at risk of attrition and support them in completing their studies.

**In addition to the need to combine study and work, common risks for attrition are social isolation, conflicts with supervisors, and the lack of support to perform teaching duties**

In the study and research phase, students are requested to earn at least 120 credits, with a recommended average of 28-30 credits per semester (Szigeti, 2019<sup>[24]</sup>). A recent study found that students who dropped out earned an average of 40–50 credits in total and typically left at the end of the third semester. The study also found evidence that fee-paying students had a higher risk of attrition than students with a state-funded scholarship. The study lists as common reasons for attrition: lack of academic preparedness, insufficient scholarships and the need to work, challenges with writing the dissertation, and combining study, work and family.

In addition to the commonly discussed reasons for attrition, the analysis of case studies and interviews points to a number of additional risks that need to be addressed by universities and higher education policy:

- **Social isolation:** This is particularly an issue among part-time students with a life outside campus, Co-operative Doctorate Programme students, and students that are not part of research groups.
- **Conflicts with supervisors:** Changing research topic can be a complex and rigid process.
- **Lack of support to perform teaching duties:** While teaching experiences could help doctoral students develop highly valued skills, e.g. decision-making, scientific rigor, communication and contribute to the development of research skills, current practice lacks guided reflection and capacity-building mechanisms.
- **Publication requirement:** (i) lack of clear guidelines to establish fairness of authorship credit in collaborative publications; and (ii) handling patents, which some doctoral schools accept instead of publications.

The decision on where to work after graduation and lack of guidance can also be stressful for doctoral students.

**Universities offer mental health support, but a more proactive approach could be considered to raise doctoral students' awareness of attrition risks and existing support**

A recent study at Corvinus University compared the views of supervisors and students on areas for improving doctoral education in Hungary. For students, the top three areas for improvement are: i) organisation of support; ii) transparent rules; and iii) quality of publications. Supervisors ranked highest: i) quality of publications; ii) overall quality; and iii) organisation of support (Michalkó et al., 2021<sup>[25]</sup>).

One area of agreement among the surveyed supervisors and doctoral students/candidates is the need to improve the organisation of support. Doctoral students can access the university's general student support services, but there are no specific services for doctoral students. Existing services are largely oriented towards bachelor's and master's students.

Universities offer mental health support, but a more proactive approach could be considered to raise doctoral students' awareness of attrition risks and existing support. Notably, students in Co-operative Doctoral Programmes may benefit from this. Their risk of academic isolation might be higher as they spent less time on campus and are not included in typical cohort structures.

*What can be learned from current institutional practice?*

**Research groups are highly valued by doctoral students for their peer connections and learning through observation, and doctoral schools can do more to ensure participation opportunities are available to all doctoral students**

Research groups are highly valued by doctoral students for the opportunities they provide to learn through observation and by being connected with peers and exposed to how new research questions emerge. As one of the interviewed doctoral candidates highlighted, there is an “opportunity to learn research skills by being part of a research group. We discuss very different aspects of handling research projects, for example, the economic viability, different timelines etc. and we, as doctoral students, are always present. We have several industry projects in the research group. The understanding is that through this we learn about decision making in research projects and industry collaboration projects. We learn how to plan ahead. It also helps to have people look at your work with a fresh eye. Our research group has 8 PhDs and 3 postdocs. We gather every 2-3 weeks.”

However, not all doctoral students are part of a research group. This can be highly challenging for these students, as noted by one of the interviewed presidents of a local chapter of the National Doctoral Students Association: “Students that are not in a research group are left on their own. They have to deal with the problems related to their research and their teaching duty on their own. If they are lucky, they have a professor that supports them in the teaching.”

*Policy options*

**Support the development of a student monitoring system to design inclusive student support services**

Universities in Hungary lack systematic information on doctoral students at risk of attrition. None of the four visited universities was working on a student monitoring system. The National Doctoral Council prepares annual completion statistics, used for the allocation of state scholarships. This could be used, as proposed by the Council in 2013 for the development of a doctoral student monitoring tool and data-supported mechanisms to detect students that have difficulty progressing with their studies, with the aim of offering them tailored support to catch up or change their field of study.

An example of how public policy can support universities in collecting data to design inclusive student support services is “Student Monitoring”, a publicly funded initiative in Austria, involving nine public universities (OECD, forthcoming<sup>[26]</sup>). The main focus is on study progression (completion, drop-out and transfer) and examination activity, as well as the effects of labour market integration and socio-demographic factors on study behaviour, performance and progress. The universities’ quality assurance units are collaborating in the development of relevant measurement indicators. The initiative is designed as a pilot (with the potential to scale up) to establish a comparative analysis of the study and labour market-related behaviour of students at the participating universities to strengthen inter-university co-operation.

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# Annex A. About the project and field work in Hungary

## About the project

To support policy makers and higher education institutions in their shared commitment to enhance the labour market relevance and outcomes (LMRO) of higher education, the European Commission and the OECD launched the LMRO Partnership Initiative in 2019, a collaborative project with the participation of Austria, Hungary, Portugal and Slovenia.

The LMRO Partnership Initiative has three objectives and related strands of work:

- 1) To assess the alignment of supply and demand in relation to graduate skills and to identify ways to improve this alignment by:
  - a. analysing detailed evidence of the labour market outcomes experienced by graduates and employers to identify the potential drivers and barriers affecting these outcomes;
  - b. identifying policy options and institutional practices with the potential to overcome existing barriers, increase the connections between higher education and the labour market, and improve associated labour market outcomes – by drawing upon international practice and research evidence.
- 2) To stimulate peer learning about policy options and institutional practices that can improve the articulation between higher education provision and labour markets.
- 3) To maximise the impact of research evidence and peer learning on institutional practice by developing a self-reflection questionnaire for higher education institutions on labour market relevance and outcomes (Annex B).

Through policy analysis, peer-learning activities and the development of a self-reflection questionnaire for use by higher education institutions, the project contributed to building national government and higher education institutional capacity to implement future higher education policy reforms. The project informed and supported the European Strategy for Universities, linking its planned aims to national and institutional context and spurring the transformation of the higher education sector.

Country-specific analyses assisted policy makers in the participating countries with the examination of existing policy portfolios, and the identification of policy options that have the potential to improve labour market relevance and outcomes of higher education.

## *Analytical framework*

The analytical framework of the project consists of eight policy and practice areas that public authorities and higher education institutions can use to enhance the articulation between higher education and the labour market, with a view to supporting good alignment between skills supply and demand:

- educational offer: curricula and programme content, programme duration and delivery modes that respond flexibly to current and predicted demand for knowledge and skills, including through programmes aimed at existing workers;
- student support and learning environment: financial and non-financial support that encourages students to develop and obtain knowledge, skills and credentials relevant to the labour market;
- policies governing staff profiles and use of time: to support a focus on developing labour market relevant knowledge and skills among students;
- labour market information: widely available, reliable and accessible information on labour market skills needs and outcomes of graduates from different programmes that is used by students and graduates to make effective career decisions;
- skills-signalling mechanisms: various mechanisms to help employers understand the skills that graduates from different programmes should possess and to help graduates convey the skills they have obtained through higher education;
- quality assurance and accreditation processes: to ensure that education credentials are of good quality and trusted by employers;
- strategic planning, forecast mechanisms and co-ordination: to help ensure the higher education system delivers programmes in response to both current and projected labour market needs;
- public funding to HEIs: taking into account the real or projected career prospects of graduates to encourage labour market-relevant provision as part of a diversified mix of higher education study options.

The project was organised in two phases. Phase 1, from March to December 2020, focused on analysing the labour market outcomes of higher education graduates, with the aim of assessing the supply and demand of graduate skills in each participating country. Phase 2, from January to December 2021, focused on analysing institutional practices that seek to enhance the relevance of the educational offer to the labour market.

### ***Call for Practices***

The Call for Practices had three aims:

- 1) To collect information on the current practices and priorities of HEIs in enhancing the labour market relevance of their educational offer.
- 2) To analyse current and planned future practices to identify enablers, success factors and barriers, and develop from these a set of statements that HEIs can use for a self-reflection exercise to identify areas for improvement.
- 3) To identify innovative practices for presentation and review in a series of peer-learning activities, which informed the development of a self-reflection questionnaire for use by higher education institutions.

The Call for Practices was addressed to all HEIs in the country and consisted of two questionnaires: “Survey on Institutional Priorities” and “Submission of Practices”. The survey period was April-June 2021.

### **Field work in Hungary**

In Hungary, the country’s participation in the project was co-ordinated by the Hungarian National Research, Development and Innovation Office. Key higher education policy stakeholders formed a National Advisory Group (NAG) and guided project decisions with their knowledge and expertise. The NAG played a leading role in identifying priority areas for the country-specific analysis. NAG members are: the American

Chamber of Commerce, the Association of Hungarian Doctoral Students, the Educational Authority, the German-Hungarian Chamber of Commerce and Industry, the Hungarian Accreditation Committee, the Hungarian Central Statistical Office, the Hungarian Chamber of Commerce and Industry, the Hungarian Innovation Association, the Hungarian Rectors' Conference, the Ministry for Innovation and Technology, the National Scientific Student Council, the National Union of Students, the Permanent Delegation of Hungary to OECD and the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the Tempus Public Foundation.

The NAG identified the undersupply of doctoral graduates in relevant fields as a key labour market alignment challenge in their country and requested that the project focus on this specific aspect of the graduate labour market.

### ***Review of higher education institutional practices***

Higher education institutional practices can have an important bearing on the quality and relevance of skills that graduates develop, and the labour market outcomes they experience after completing their studies. To examine these practices, the project team carried out interviews with higher education policy stakeholders and virtual study visits to a non-statistical sample of HEIs, proposed by the national co-ordinator (Table 4; Table 5).

**Table 4. Stakeholder interviews in Hungary**

<b>Stakeholder groups interviewed as part of the project</b>	<b>Number of interviewees</b>
Doctoral school leadership	19
Employer representatives	18
Career centres, student support services in universities	14
Doctoral students/candidates	14
University leadership	10
Supervisors of doctoral students/candidates	9
Doctoral students/candidates participating in Co-operative Doctora Programmes	6
Study programme co-ordinators	4
University staff with a post-doctoral position	4
Third-mission units (e.g. technology transfer offices, science parks)	4
Ministries or government agencies	4
Other members of the National Advisory Group (other than those stakeholders listed here)	4
Teaching staff in doctoral programmes	3
Higher education sector representative bodies	3
Internal quality assurance units of universities	2
National (Doctoral) student representative bodies	2
National quality assurance agency	1
<b>Total number of interviewees</b>	<b>121</b>

Table 5 gives an overview of the virtual study visits and the Call for Practices that were carried out as part of the review of higher education institutional practices.

Table 5. Study visits and Call for Practices in Hungary

Study visits	Call for Practices
University of Debrecen: 8-10 June 2021, 24 interview partners	Number of participating institutions: 8
University of Szeged: 24-25 June 2021, 30 interview partners	Number of submissions: 11
Eötvös Loránd University, ELTE: 29-30 June 2021, 29 interview partners	Submissions by universities with:
University of Pécs: 30-31 August 2021, 18 interview partners	> 200 doctoral students: 6
	≤ 200 doctoral students: 5

### Survey results

All of the 28 universities that have students enrolled in doctoral degree programmes were invited to participate in a survey of current practices and institutional priorities and 18 universities participated. The total response rate was 64%. The universities that participated in the survey host 84% of the doctoral students in Hungary (Table 6).

The questionnaire contained both closed-ended and open-ended questions. Respondents were asked to (i) rate the institutional coverage of current practices (on a scale from no activity exists to institution-wide activities, with an activity defined as “any form of action undertaken to enhance the labour market relevance and outcomes of the HEI’s educational offering”); (ii) prioritise a maximum of three areas for further development over the next two to three years; (iii) describe the current use of information on graduate labour market outcomes and employer skills demand; and (iv) state whether there are institutional quality assurance procedures in place related to the labour market relevance of the educational offer or whether there are plans to develop such procedures.

Table 6. Hungary: Institutional survey

Institutional survey	
Total number of responding universities:	18
Total number of universities invited to participate:	28
Survey response rate:	64%
Response rate by type of institution:	
	State universities: 58% (14 out of 24)
	Church universities: 38% (3 out of 8)
	Private universities: 25% (18 out of 36)
Response rate by number of doctoral students (2018/19):	
	> 200 doctoral students: 67% (8 out of 12)
	≤ 200 doctoral students: 42% (10 out of 24)
Response rate by size of institution (number of enrolled students in 2018/19):	
	38-999: 25% (8 out of 32)
	1000-9999: 53% (10 out of 19)
	10000-31000: 64% (7 out of 11)

Note: Response rates by size of institution and number of doctoral students are based on the number of enrolled students in the latest available year as published on the Hungarian Higher Education data portal (2020<sub>[1]</sub>).

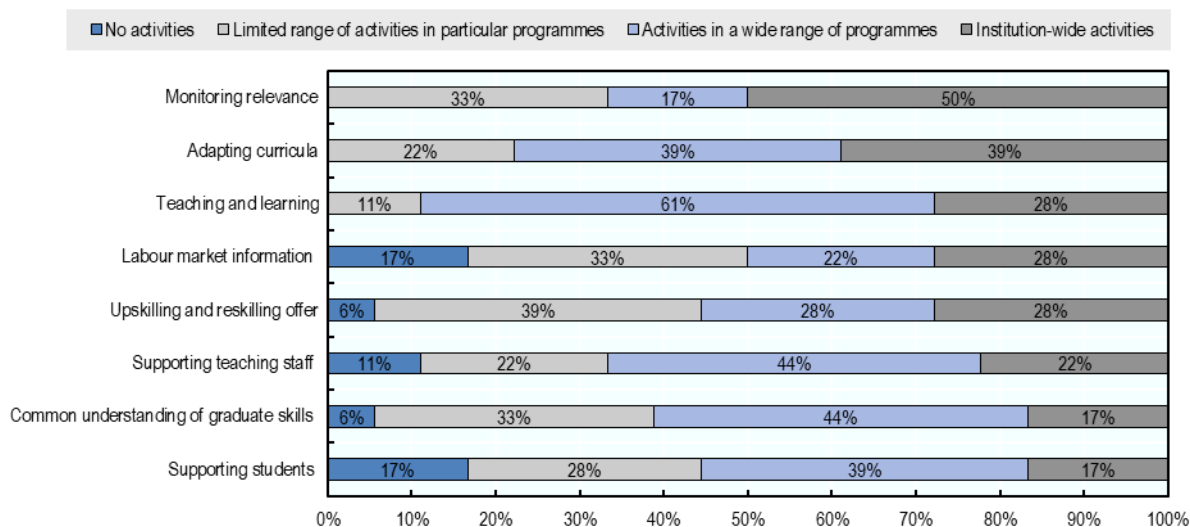
Source: LMRO Call for Practices: “Survey of Institutional LMRO Priorities”. Survey period: April-June 2021.

The survey covered eight areas of current practices and priorities of HEIs in enhancing the labour market relevance of their educational offer (**LMRO practices**):

- monitoring and ensuring the continued relevance of the educational offer (**monitoring relevance**);
- adapting curricula, the mix and flexibility of programmes, and qualifications to respond to evolving labour market demands (**adapting curricula**);
- using teaching practices, learning environments and assessment methods to equip students with skills valued by employers, including transversal skills (**teaching and learning**);
- supporting teaching staff to keep up-to-date with innovation and societal challenges linked to their discipline, and to reflect this in their teaching (**supporting teaching staff**);
- building a common understanding of graduate skills through collaboration with employers and creating trusted mechanisms for students to signal their skills (**common understanding of graduate skills**);
- using labour market information to guide study choices (enrolling in and/or switching study programmes, and/or choosing specialisations) and career decisions (**labour market information**);
- supporting students to enrol and succeed in study programmes with high labour demand (**supporting students**);
- meeting the needs of learners who seek up/reskilling through adapting curricula, the mix and flexibility of programmes, and qualifications (**upskilling and reskilling offer**).

Figure 7. Current coverage of LMRO practices

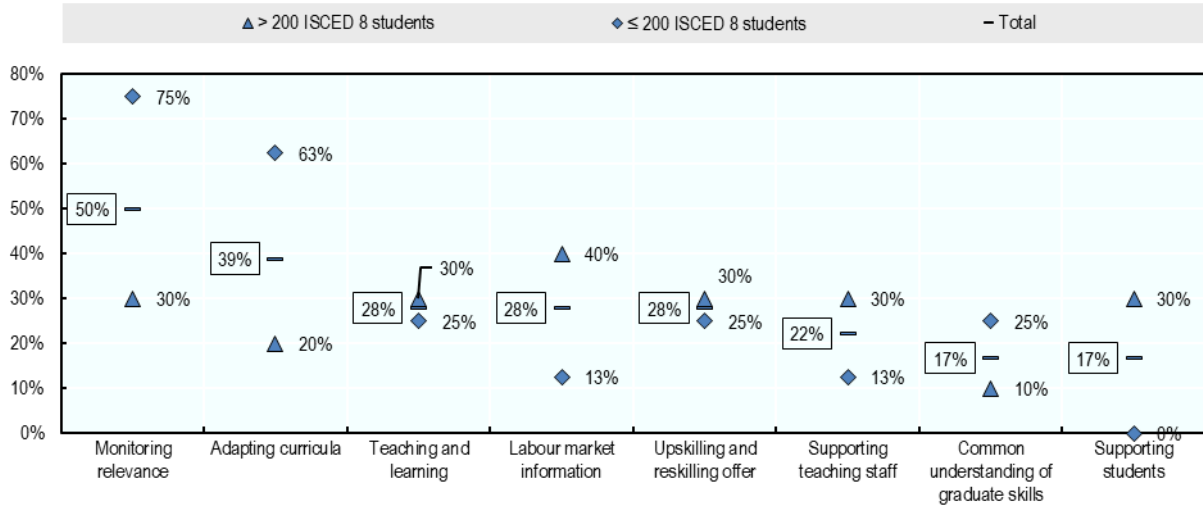
Please rate the status quo of the following eight areas:



Note: Sorted in descending order for the share of institution-wide activities. The questionnaire provided the following explanation for “activity”: “An activity includes any form of action undertaken to enhance the labour market relevance and outcomes of the HEI’s educational offer”.

Source: LMRO Call for Practices: “Survey of Institutional LMRO Priorities”. Survey period: April-June 2021.

Figure 8. Presence of institution-wide activities of LMRO practices by number of doctoral students

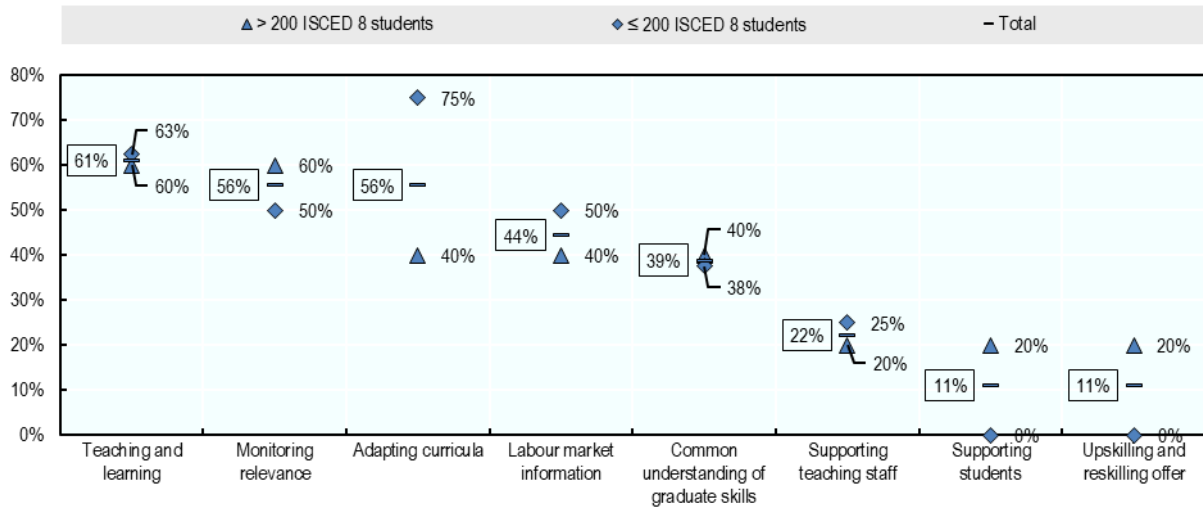


Note: LMRO practices are shown in descending order by total. Percentage of respondents who stated that institution-wide activities exist for each of the eight areas of LMRO practices. The questionnaire provided the following explanation for “activity”: “An activity includes any form of action undertaken to enhance the labour market relevance and outcomes of the HEI’s educational offer.” Response rates by size of institution and number of doctoral students are based on the number of enrolled students in the latest available year as published on the Hungarian Higher Education data portal.

Source: LMRO Call for Practices: “Survey of Institutional LMRO Priorities”. Survey period: April-June 2021.

Figure 9. Medium-term LMRO priorities of universities by number of doctoral students

Which are the most important areas you would like to develop further over the next 2-3 years?



Note: LMRO practices are shown in descending order by total. Response rates by size of institution and number of doctoral students are based on the number of enrolled students in the latest available year as published on the Hungarian Higher Education data portal.

Source: LMRO Call for Practices: “Survey of Institutional LMRO Priorities”. Survey period: April-June 2021.

## Annex B. Self-reflection questionnaire for HEIs on the articulation with the labour market

This self-reflection questionnaire aims to support higher education institutions (HEIs) in Slovenia and elsewhere: i) to reflect on the articulation of higher education with the labour market, by identifying strengths and weaknesses of current institutional practices; and ii) to identify and scale-up effective institutional practices. The self-reflection questionnaire can stimulate (international) peer learning among study programmes and HEIs, and help HEI leadership to identify strategic institutional development priorities.

This self-reflection questionnaire contains five categories with examples of current institutional practice that were found to have the potential to enhance the articulation between higher education and the labour market and the alignment between skills supply and demand. Each category was examined in a peer-learning event, which gathered an international audience of higher education policy stakeholders, including policy makers, leaders of HEIs, teaching and administrative staff, higher education researchers, and representatives of quality assurance bodies, industry and student unions. Seminar brochures document the discussion and exchange of policy and practice examples among stakeholders, and are a resource for policy makers and practitioners to support new initiatives and further develop existing initiatives (Table 7).

**Table 7. Crosswalk: Self-reflection categories and international peer-learning seminars**

Self-reflection category	LMRO Partnership Initiative's international seminars
<b>Monitoring the relevance of the educational offering</b>	"Using labour market information to improve learners' choices and curriculum" (November 2020)
<b>Adapting the educational offering and skills signalling</b>	"Stimulating innovation through inter- and trans-disciplinarity in education and research" (March 2022)
<b>Continuous development of teaching practices and learning environments</b>	"Supporting improvement in teaching and learning to address students' needs and labour market demands" (March 2022)
<b>Supporting student enrolment in study programmes with high labour demand</b>	"Widening access and attracting students to fields with high labour market demand" (February 2022)
<b>Supporting student success in higher education and in the labour market</b>	"Raising study success through student support and improved career-study linkages" (February 2022)

## 1. Monitoring the relevance of the educational offering

The HEI monitors the relevance of the educational offering in light of changing labour market needs.

	Not practiced	Pilot initiatives	Further development underway	Established practice
Use of publicly available information on graduate employment outcomes and current and emerging employer skill demand to monitor relevance of the educational offer, update curricula and support students in their study choices				
Encourage the collection, analysis and use of labour market information by providing guidance for the evaluation of initiatives, and support for the upscaling of successful initiatives				
Use of strategic collaboration with firms to learn about emerging skill needs				
Support for study programmes to make effective use of labour market information for curricula updates and study guidance				

For relevant policy and practice examples and brief descriptions of initiatives, see the Seminar Brochure “Using labour market information to improve learners’ choices and curriculum”. Download the seminar brochure at <https://www.oecd.org/education/higher-education-policy/>.

## 2. Adapting the educational offering and skills signalling

The HEI adapts its educational offering (curricula, mix of programmes and qualifications) to evolving labour market needs, and builds a common understanding of graduate skills and trusted mechanisms for students/graduates to signal their skills to employers.

	Not practiced	Pilot initiatives	Further development underway	Established practice across the institution
External and/or internal quality assurance processes of study programmes are used to identify opportunities for adapting curricula				
Courses that equip students with in-demand transversal/transferable skills (e.g. digital skills), and knowledge of relevant cross-disciplinary topics (e.g. environmental sustainability) are offered as specialisations or add-ons to study programmes				
Technology transfer offices, business participation in governing boards, career centres and other HEI units with strategic employer relations are actively involved in communicating the skills content of (new) educational offers to students and employers using/developing well-recognised formats (e.g. micro-credentials, badges, etc.)				
Machine-readable records of study programmes are used to increase the efficiency of quality assurance and curricula update, and are used to improve skills-signalling mechanisms which permit employers to recognise the skills content of study programmes				

For relevant policy and practice examples and brief descriptions of initiatives, see the Seminar Brochure “Stimulating innovation through inter- and trans-disciplinarity in education and research”. Download the seminar brochure at <https://www.oecd.org/education/higher-education-policy/>.



### 3. Continuous development of teaching practices and learning environments

The HEI promotes the continuous development of teaching practices, learning environments and assessment methods that equip students with transversal/transferable skills, and encourages and supports teaching staff to keep up-to-date with innovation and societal challenges linked to their discipline, and to reflect this in their teaching.

	Not practiced	Pilot initiatives	Further development underway	Established practice across the institution
Support learning among peers within the HEI and in an international context to adopt and further develop teaching practices, learning environments and assessment methods				
Project-based learning is offered across programmes and levels of study to allow students to gain practical experience in the “world of work” as part of their study programme				
Organise the involvement of students in collaborative research projects facilitating transversal skills development, identifying and documenting the skills developed				

For relevant policy and practice examples and brief descriptions of initiatives, see the Seminar Brochure “**Supporting improvement in teaching and learning to address students’ needs and labour market demands**”. Download the seminar brochure at <https://www.oecd.org/education/higher-education-policy/>.

### 4. Supporting student enrolment in study programmes with high labour demand

The HEI supports student enrolment in study programmes with high labour demand.

	Not practiced	Pilot initiatives	Further development underway	Established practice across the institution
Collaboration with secondary schools to demonstrate the societal relevance of in-demand study programmes, for example in science, technology, engineering and mathematics (STEM), to raise interest among learners				
Prospective students receive information that describes the study environment, academic requirements, and labour market prospects of programmes as authentically as possible				
Prospective students are made aware of the academic support available to them (e.g. tutoring, STEM, academic writing)				
Students are offered study guidance for electives, specialisations, higher-level studies and the HEI’s upskilling and reskilling offer				

For relevant policy and practice examples and brief descriptions of initiatives, see the Seminar Brochure “**Widening access and attracting students to fields with high labour market demand**”. Download the seminar brochure at <https://www.oecd.org/education/higher-education-policy/>.

## 5. Supporting student success in higher education and in the labour market

**The HEI supports student success in study programmes with high labour market demand, and meets the needs of diverse learners, including those combining study with work/care obligations.**

	Not practiced	Pilot initiatives	Further development underway	Established practice across the institution
Use of predictive analytics and proactive advising to identify and support students at risk of attrition				
Diversity-sensitive teaching and curricula designed to have practice-based elements in the beginning of a programme are used to meet the needs of different types of learners and to increase study engagement and success				
Peer-delivered study guidance (e.g. tutoring) and support delivered by the HEI's central units are linked up to increase the effectiveness of guidance and support, and to design targeted services				
Students are informed about the potential adverse impact of the number of hours worked per week on study engagement				
Structured approaches to support students to combine study and work (e.g. partnerships with guidelines for companies defining the maximum amount of working hours per week)				
Frequent touchpoints with supervisors and academic writing support are offered to help students with their dissertations				
Participation opportunities in research groups for doctoral students to benefit from peer connections and learning through observation				
Services of career centres reach students early in their studies and are tailored to different levels of study				
Efforts to meet the needs of learners who seek up/reskilling through adapting curricula, the mix and flexibility of programmes, and qualifications				

For relevant policy and practice examples and brief descriptions of initiatives, see the Seminar Brochure **“Raising study success through student support and improved career-study linkages”**. Download the seminar brochure at <https://www.oecd.org/education/higher-education-policy/>.

This Education Policy Perspective has been authorised by Andreas Schleicher, Director of the Directorate for Education and Skills, OECD.

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