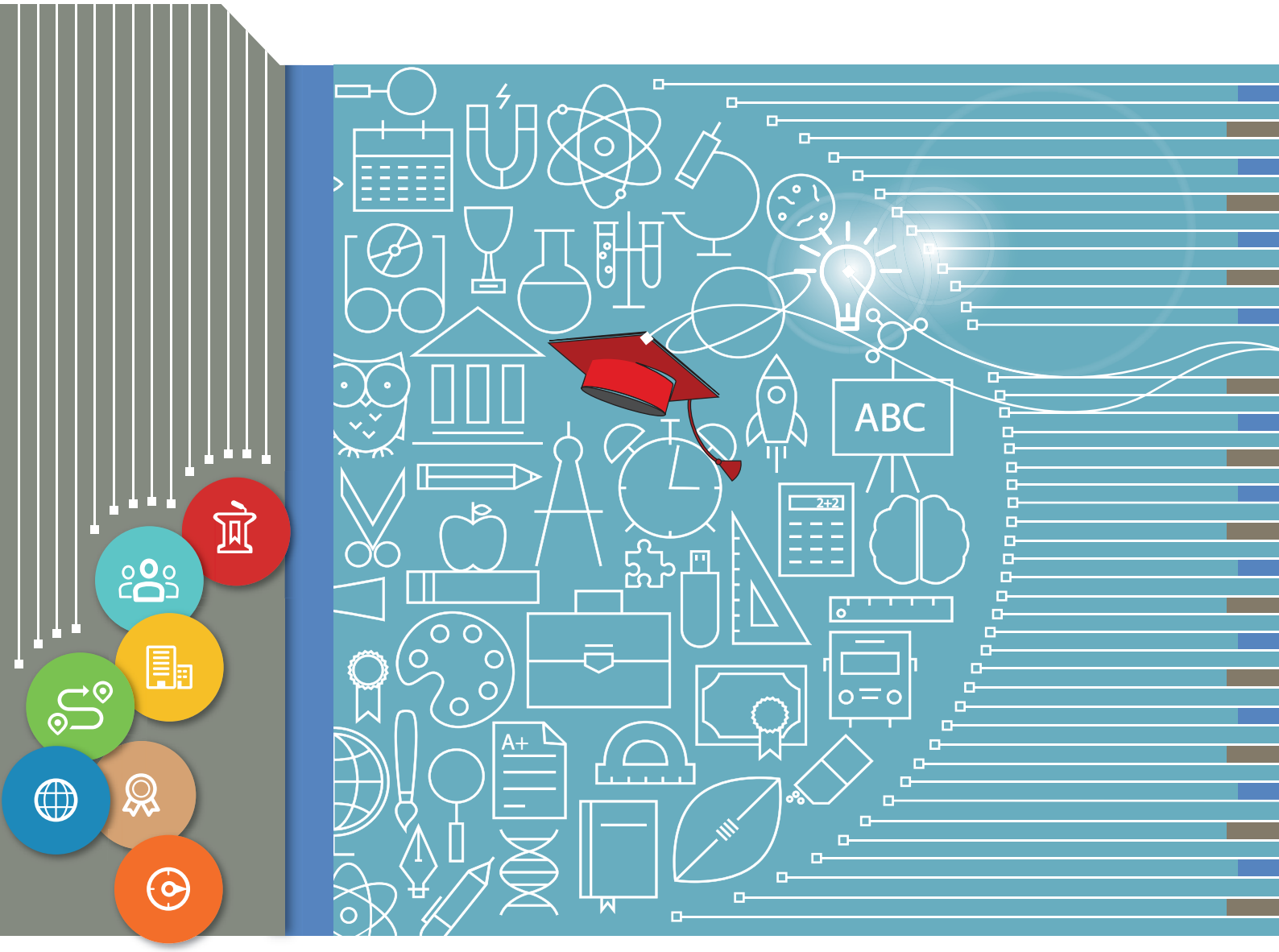
OECD Skills Studies

Supporting Entrepreneurship and Innovation in Higher Education in Hungary



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Preface

European higher education systems increasingly have to change the way they operate due to the revolution in information and communication technologies, the financial crisis, global competition and pressure on budgets. One of the most significant changes in response to these challenges has been the development, both in concept and practice, of the "Entrepreneurial University" which puts greater emphasis on innovation in all areas, from research to teaching and learning, knowledge exchange, governance and external relations.

Higher education institutions (HEIs) have a critical role to play in promoting local economic development by providing education that promotes entrepreneurial mindsets and behaviours, providing support to graduates and staff interested in starting up businesses, rendering research relevant for society, engaging in knowledge exchange, and by acting entrepreneurially themselves as institutions. While higher education institutions in Europe are beginning to introduce strategies and practices in this area, the progress is uneven, both across and within countries, and efforts are needed to spread the most promising initiatives and level up performance. The guiding framework for the entrepreneurial university jointly developed by the OECD and the European Commission is a great tool for higher education institutions to assess their entrepreneurial and innovative potential.

In Autumn 2015, when the Ministry of Human Capacities entered into an agreement for an HEInnovate country review, the HEInnovate guiding framework was already known in Hungary. Because of the active role of the Tempus Public Foundation, 20 HEIs had participated in HEInnovate workshops. Being one of the first countries to participate in this international initiative is, in itself, a great opportunity for Hungarian higher education, at institutional level and at the public policy level too. At institutional level, beyond the primary benefit of being present on the international scene, introducing and applying the HEInnovate tool has furthered dialogue and thinking within institutions.

The Tempus Public Foundation, as co-ordinator of European Educational Co-operation programmes, is highly engaged in encouraging and assisting the participation of Hungarian HEIs' in the learning and co-operation network of HEInnovate activities. It was involved in the dissemination and information process of HEInnovate from the beginning, being among the first to organise an HEInnovate workshop for representatives of HEIs from Hungary and neighbouring countries. The Tempus Public Foundation was honoured to be designated as a contact point between the EC, the OECD, the Ministry of Human Capacities, the national HEInnovate experts and the participating institutions in the OECD HEInnovate review and is also engaged to assist and further develop this process in co-operation with the Ministry of Human Capacities, the EC and the OECD.

The country review has concrete policy impact. The Ministry of Human Capacities, in collaboration with the Tempus Public Foundation, has developed a set of practical recommendations and support mechanisms for Hungarian HEIs. An expert group with representatives from various HEIs, innovative companies and various policy actors is supporting this work.

László Palkovics
Minister of State for Education,
Ministry of Human Capacities

András Nemeslaki
President Tempus Public Foundation

Preface

Higher education institutions (HEIs) play a critical role in providing the high-level skills the modern economy needs, by assisting talented people to transition into employment, generating and disseminating knowledge, driving innovation, and working together with business, government and civil society to promote economic and social development. However, HEIs must adapt their organisational approaches, and better integrate research activities, teaching methods and external engagement practices to reach their full potential.

Priorities for change include; integrating new teaching methods into the curriculum; developing new activities to stimulate entrepreneurial mindsets; providing support to start-up's; strengthening knowledge exchange and collaboration with business and the wider world, and taking a more international approach to HEI activities. Governments can support the evolution of more innovative and entrepreneurial HEIs by adapting the incentives and support structures within their education systems to be more relevant, and through specific public programmes at national and regional levels that support new approaches in HEIs in areas such as teaching and learning, knowledge exchange and start-up support.

Pioneering initiatives are emerging in a number of HEIs. They need to be broader, more systematic and taken forward by HEI leaders in collaboration with key stakeholders. This is the aim of HEInnovate, a joint initiative by the European Commission (EC) and the Organisation for Economic Co-operation and Development (OECD). HEInnovate is a guiding framework that provides inspiration and assistance for governments and HEIs to stimulate innovation and entrepreneurship. It includes an online self-assessment tool (*www.heinnovate.eu*) covering the seven dimensions of the innovative and entrepreneurial HEI, which enables HEIs to organise a participatory stock-taking exercise to review achievements and identify areas for improvement. Available in all EU Member State languages it includes good practice case studies and workshop materials. Beyond supporting individual HEIs, the EC and the OECD implement country reviews in partnership with governments to advance change at higher education system level. Ireland was one of the first countries to participate in the HEInnovate country reviews.

In Hungary, increased attention to innovation and entrepreneurship both from public policy actors and HEI leadership has triggered an incremental change process in the organisational culture of HEIs and a new approach to education and research for students and staff. We believe that this report offers valuable lessons for policy makers, HEI leaders and staff, and local development stakeholders in Hungary and beyond.

Mari Kiviniemi
OECD Deputy Secretary-General

Martine Reicherts
Director General for Education, Youth, Sport and Culture, European Commission

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The HEInnovate country review of Hungary was a collaborative effort between the OECD Centre for Entrepreneurship, SMEs, Local Development and Tourism, the Directorate General for Education and Culture of the European Commission, the Hungarian Ministry of Human Capacities and the Tempus Public Foundation. The Ministry of National Economy and the Hungarian Rector's Conference participated in the review steering group.

This report was prepared by Andrea-Rosalinde Hofer, Policy Analyst, and supervised by Jonathan Potter, Head of the Entrepreneurship Unit, as part of the programme of work of the OECD Local Economic and Employment Development (LEED) Programme, under the leadership of Sylvain Giguère, Head of the LEED Division.

Sections of this report were drafted by Andrea-Rosalinde Hofer, OECD (Chapters 1 and 2) with support from Zsuzsa Jávorka, Senior Consultant, Technopolis Group, Ruaidhri Neavyn, Policy Advisor to the Higher Education Authority in Ireland (Chapter 3), Matthias Geissler from the Technical University of Dresden (Chapter 4), and Jakob Stolt from Aalborg University in Copenhagen (Chapter 5). This report also draws on a background report, which was prepared as part of this project by István Kovacs and Lazlo Horvath from ELTE University. Peter Baur from the Directorate General for Education and Culture of the European Commission participated in various review activities.

A key source of information for this report were study visits to the University of Debrecen, Semmelweis University, Széchenyi István University, Szent István University, and the Eszterházy Károly University of Applied Sciences. These study visits were organised by Szilvia Besze from the Tempus Public Foundation in collaboration with the local HEInnovate co-ordinators: Tamás Bene (University of Debrecen), Lilla Farkas (University of Semmelweis), Tibor Dőry (Széchenyi István University), Gabriella Ambriskó (Szent István University), Ibolya Prokajné, Dr. Szilágyi (Eszterházy Károly University of Applied Sciences). Their enthusiasm, commitment and support were crucial for the review.

This report benefited greatly from knowledge shared by those who participated in the meetings during the study visits. Additional information was collected through a survey of all public higher education institutions (HEIs) in Hungary and a student survey at the HEIs that participated in the study visits. Instrumental for the implementation of the review process were Szilvia Besze from the Tempus Public Foundation, Adam Szigeti, Head of Department and Beatrix Borza from the Hungarian Ministry of Human Capacities.

The authors are also grateful to Joseph Tixier, Guia Bianchi, Eleanor Davies, Elisa Campestrin and Pauline Arbel of the LEED Programme for providing research and technical assistance, to Kay Olbison for proofreading, and to Janine Treves and Carmen Fernandez Biezma of the OECD Public Affairs and Communications Directorate.

Table of contents

Abbreviations and acronyms 10
Reader's guide 11
Executive summary 17

Chapter 1. **Overview of the Hungarian higher education system** 21
Introduction 22
Higher education in Hungary 23
Higher education policy framework 28
The role of higher education in the country's research, innovation and development system 31
Notes 39
References 39

Chapter 2. **Applying HEInnovate to higher education in Hungary** 41
Leadership and governance 42
Organisational capacity, people and incentives 49
Entrepreneurial teaching and learning 52
Preparing entrepreneurs 57
Knowledge exchange 61
Internationalised institution 65
Measuring impact 68
Recommendations for public policy action 70
Recommendations for higher education institutions 71
Notes 73
References 73

Chapter 3. **Enhancing the organisational capacity of Hungary's higher education institutions** 75
Introduction 76
Analysis and findings 78
References 91

Chapter 4. **Enhancing knowledge exchange and collaboration in Hungarian higher education institutions** 93
Introduction 94
Analysis and findings 96
Notes 112
References 112

Chapter 5. **Strengthening entrepreneurship support in Hungarian higher education** . . . 113
Introduction . . . 114
Analysis and findings . . . 116
Notes . . . 125
References . . . 125

Annex. **HEInnovate framework and good practice statements** . . . 127

Tables

1.1. Summary overview of key facts on the Hungarian higher education system . . . 27
1.2. Examples of Co-operative Research Centres and Regional Knowledge Centres in the case study HEIs . . . 34
1.3. Overview of RDI relevant measures and calls in the Operational Programmes 2014-20 . . . 35

Figures

1.1. Distribution of key research and development resources in Hungary (2004, 2014) . . . 32
2.1. Entrepreneurship objectives of Hungarian higher education institutions . . . 43
2.2. Measures to enhance participation in entrepreneurship education . . . 45
2.3. Strategic partners of Hungarian higher education institutions . . . 48
2.4. Financing entrepreneurship support in Hungarian higher education institutions . . . 49
2.5. Staff rewards in Hungarian higher education institutions . . . 52
2.6. Teaching methods in Hungarian higher education institutions . . . 53
2.7. Teaching methods in entrepreneurship courses in Hungarian higher education institutions . . . 54
2.8. Advertising extra-curricular entrepreneurship activities in Hungarian higher education institutions . . . 56
2.9. Partners of Hungarian higher education institutions for entrepreneurship education . . . 57
2.10. Target groups for entrepreneurship support in Hungarian higher education institutions . . . 58
2.11. Offer and demand for start-up support measures . . . 59
2.12. Training for venture creation in Hungarian higher education institutions . . . 60
2.13. Partners of Hungarian higher education institutions in knowledge exchange activities . . . 63
2.14. Location of knowledge exchange partners of Hungarian higher education institutions . . . 64
2.15. Internationalisation activities of Hungarian higher education institutions . . . 67
2.16. Evaluation practice of knowledge exchange activities in Hungarian higher education . . . 70
5.1. Elements of student involvement in entrepreneurship education . . . 117

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Abbreviations and acronyms

ECTS	European Credit Transfer and Accumulation System
EIT	European Institute of Technology
Erasmus	European Region Action Scheme for the Mobility of University Students
EU	European Union
EUA	European University Association
FIEK	Operational Programme Higher Education and Industry Collaboration Centres (Hungarian language)
FIR	Higher Education Information System in Hungary
FTE	Full-time equivalent
GDP	Gross Domestic Product
GINOP	Operational Programme Economic Development and Innovation (Hungarian language)
GUESSS	Global University Entrepreneurial Spirit Students' Survey
HAC	Hungarian Accreditation Committee
HEIs	Higher education institutions
HIPO	Hungarian Intellectual Property Office
IAU	International Association of Universities
ISCED	International Standard Classification of Education
KKK	Defined learning outcomes for higher education (Képzési és Kimeneti Követelmények)
KTIA	Public research funding programme in Hungary
NGOs	Non-governmental organisations
NKFIA	National Research, Development and Innovation Fund (Hungarian language)
NKFIH	National Research, Development and Innovation Office
OECD	Organisation for Economic Co-operation and Development
OKMR	Teacher and Researcher Quality Assessment (Hungarian language)
OTKA	Research funding programme (Hungarian language)
PISA	Programme for International Student Assessment
R&D	Research and development
RDI	Research, development and innovation
SMEs	Small and medium-sized enterprises
STEM	Science, Technology, Engineering and Mathematics
TOP	Operational Programme Territorial Development (Hungarian language)
TTO	Technology Transfer Office
VEKOP	Operational Programme Competitive Central-Hungary (Hungarian language)

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Reader's guide

The reader's guide provides information on the HEInnovate conceptual framework and online tool. It presents the methodology used in the Hungarian country review and concludes with a brief overview of the chapters in this report.

The HEInnovate framework

Conceptual framework

Higher education is changing across European Union and OECD countries and there is a growing expectation from policy makers and society that higher education institutions (HEIs) should evolve into a new type of economic actor. Entrepreneurship and innovation in higher education are no longer only associated with business start-ups and technology transfer but are increasingly understood as core elements of a procedural framework for how organisations and individuals behave. For example, in how links between teaching and research are created and nurtured, how societal engagement and knowledge exchange are organised, how resources are built and managed for effective partnerships, and how new entrepreneurs are supported.

Transforming (traditional) HEIs into entrepreneurial and innovative organisations is neither an easy nor a straightforward endeavour. It requires commitment of resources into areas of change and high impact which, in turn, needs to build on a strategic collaboration between policy makers, HEI leaders, staff, students, and partners in the local economy. The aim of HEInnovate is to stimulate and contribute to this strategic collaboration with a guiding framework that describes the innovative and entrepreneurial higher education institution through a set of good practice criteria that has been distilled from an ongoing analysis of current HEI practices across European Union and OECD countries.

HEInnovate was developed collaboratively by the Directorate General for Education and Culture (DG EAC) of the European Commission and the Centre for Entrepreneurship, SMEs, Local Development and Tourism of the Organisation for Economic Co-operation and Development (OECD). Also contributing was a network of innovation and entrepreneurship professors and experts from across European Union countries. The stimulus for HEInnovate was the University-Business Forum in March 2011, an annual event organised by the European Commission for HEIs and their key strategic partners. Delegates expressed a need for support and guidance in implementing practices that will help them become more innovative and entrepreneurial institutions.

A working definition was agreed which describes the innovative and entrepreneurial HEI as "designed to empower students and staff to demonstrate enterprise, innovation and creativity in teaching, research, and engagement with business and society. Its activities are directed to enhance learning, knowledge production and exchange in a highly complex and changing societal environment; and are dedicated to create public value via processes of open engagement". How this can be translated into daily practice in HEIs is described through 37 statements, which are organised within the following seven dimensions (please refer to the Annex for the full HEInnovate guiding framework):

1. Leadership and Governance
2. Organisational Capacity: Funding, People and Incentives
3. Entrepreneurial Teaching and Learning

4. Preparing and Supporting Entrepreneurs
5. Knowledge Exchange and Collaboration
6. The Internationalised Institution
7. Measuring the Impact

HEInnovate online tool

A freely available online self-assessment tool (*www.heinnovate.eu*) covering the seven dimensions of the "entrepreneurial university" was developed for HEIs to organise a participatory stock-taking exercise to review achievements and identify areas for improvement. It is possible to involve a wide range of stakeholders (leadership, staff, academic and administrative staff, key partner organisations etc.), and to repeat the exercise over time. Users can choose to remain anonymous and data is accessible only to users. The seven dimensions are available in all EU Member State languages.

Explanations of the statements, a growing number of cases studies, multimedia material and workshop facilitation tools, make the online tool inspirational and very user-friendly. Users can work with all dimensions or choose dimensions that are most relevant for their purpose. For example, users are likely to choose "Organisational Capacity" and "Knowledge Exchange" if the purpose is to (re)organise collaboration with external stakeholders.

An instant reporting function generates a snapshot of the status quo and potential areas of change in the chosen dimensions, comparing the rating of the user/user group to the global/HEI mean. The report points users to guidance material and case study examples with information on concrete actions that HEIs can undertake to enhance their performance in the respective dimension(s). Results are stored and can be compared over time.

There are various examples of how HEIs have been using the HEInnovate online tool. Several HEIs have been using it to organise a creative consultation process around their institutional strategy (e.g. Manchester Metropolitan University in the UK), to design new cross-faculty education programmes (e.g. University of Aveiro in Portugal), for the re-organisation of entrepreneurship support infrastructure (Dundalk Institute of Technology in Ireland), or for the organisation of knowledge exchange activities (e.g. University of Ruse in Bulgaria).

HEInnovate country review methodology

The seven dimensions and good practice statements are also used for policy and system reviews at the regional and country levels. The aim of these reviews is to provide a roadmap for strengthening the innovative and entrepreneurial higher education institution. Following a peer-review approach, involving policy makers, HEI leaders, academic and administrative staff members, and researchers from other countries, key areas of strength and areas for improvement are identified and analysed. Recommendations are presented for policy measures that can be implemented by national and sub-national governments, as well as for actions that HEIs can take to act upon opportunities and overcome barriers. The reviews also help to identify and examine examples of good practice, which may have been below the radar of policy makers and HEI leaders and thus provide valuable learnings for the higher education system in the country and beyond.

To date, HEInnovate country reviews have been undertaken in Bulgaria (2014), Ireland (2015-16), Poland (2015-16), Hungary (2015-16), and the Netherlands (2016-17).

Method applied in the country-level review in Hungary

The HEInnovate country review of Hungary was a collaborative effort between the Local Economic and Employment Development Programme of the Organisation for Economic Co-operation and Development (OECD), the Directorate General for Education and Culture of the European Commission (DG EAC), the Hungarian Ministry of Human Capacities, and the Tempus Public Foundation. The Ministry of National Economy and the Hungarian Rector's Conference participated in the review steering group. The methodology used in the Hungary review was the same as in other HEInnovate reviews and includes the steps described below.

1. Selection of case study HEIs

The selection of HEIs to be covered in the study visits was undertaken by the Ministry of Human Capacities and the Tempus Public Foundation Hungary in consultation with the OECD and the European Commission. Several factors were considered during the selection of HEIs, including type of institution and academic focus (e.g. general university, applied sciences university, etc.), size (e.g. number of students) and location (e.g. rural, urban). Applications were sought from HEIs to participate in the review and subsequently the Ministry of Human Capacities and the OECD jointly selected five higher education institutions for an in-depth study. These were Debrecen University, Semmelweis University, Széchenyi István University, Szent István University, and the Eszterházy Károly University of Applied Sciences.

2. Background report and kick-off workshop

A background report was prepared. It contains information on the Hungarian higher education system, as well as profiles of the HEIs and regions that were included in the study visit. Material from the background report has been integrated into this report.

A kick-off workshop for the project was held in Budapest on 7 December 2015. It was organised by the Ministry of Human Capacities and the Tempus Public Foundation Hungary together with the OECD and the European Commission. Representatives of each of the five HEIs selected for the study visits, the Ministry of the National Economy, the Rectors Conference, and other national-level higher education stakeholders attended the meeting.

The purpose of the workshop was to familiarise the participants with the HEInnovate tool, the review method, and to identify the following HEInnovate dimensions as focus areas of the review: Organisational Capacity, Preparing and Supporting Entrepreneurs, Knowledge Exchange and Collaboration. A representative of the OECD Secretariat presented the HEInnovate country-level review methodology and outlined the expectations for participating HEIs. The European Commission presented the HEInnovate tool and explained how the HEIs could use and benefit from it.

3. Study visits

An international review team, led by the OECD Secretariat, completed a nine-day country visit to Hungary. During the visit, the international review team undertook one-day study visits to the above mentioned five case study HEIs to meet with rectors and vice-rectors, deans, professors, career offices, technology transfer offices, business incubators, student associations, student and staff start-up companies, students taking entrepreneurship courses and alumni. Information on challenges in the current approach to

enhance innovation and entrepreneurship in and through higher education and opportunities for improvement was systematically gathered through a series of individual interviews, focus groups and roundtable meetings.

4. *HEI Leader Survey*

An online survey of HEI leaders was used to complement the information obtained in the background report and the study visits. The survey was sent to all 53 state and non-state HEIs in Hungary. The survey was conducted in Hungarian and English and HEIs could complete it between 20 June 2016 and 3 November 2016.

The online survey was based on the HEInnovate framework and contained seven sections. The questionnaire asked about i) the strategic directions of the HEI, ii) management of human and financial resources, iii) teaching and learning environment, iv) current practices in knowledge exchange, v) current practices in internationalisation, vi) current practices in entrepreneurship education, and vii) current practices in business start-up support.

There are 53 accredited HEIs in Hungary, of which 28 are universities (21 state-owned), 7 universities of applied sciences (5 state-owned), and 18 colleges of education (3 state-owned). The survey was sent to the Rector's offices. Responses were collected between 29/6/2016 and 3/11/2016. The questionnaire was available in Hungarian and English languages. A total of 28 HEIs completed the survey, including all five case study HEIs. Of the 28 responses, 15 are universities, 6 universities of applied sciences and 7 colleges of education. For the analysis in the report the colleges of education were grouped together. The survey response rate for universities is 54% and 52% for other HEIs; the overall survey response rate is 53%.

5. *Report*

This report was prepared with inputs from the international review team and the local review co-ordinator, drawing on information gathered during the study visits and the HEI Leader Survey. An interim report summarising key findings and preliminary recommendations was circulated in September 2016 for comments. Written feedback on observations from the study visits and suggested actions were sent to the case study HEIs.

A draft report was presented and discussed in an interactive workshop in Budapest on 29 November 2016. The workshop was attended by representatives of the case study and other Hungarian HEIs, the Ministry of Human Capacities, the Tempus Public Foundation, the Ministry of the National Economy, and the Hungarian Rectors' Conference. The workshop was used to discuss and refine the review findings and recommendations, and to collectively specify possible priority actions and discuss how they would be undertaken Following the workshop, the OECD Secretariat finalised the report, taking into account written feedback and contributions made in the workshop.

The content of this report

Chapter 1 provides an overview of the Hungarian higher education system and highlights key challenges and opportunities resulting from recent policy developments. The chapter also describes the multiple roles of HEIs in the country's research, development and innovation (RDI) and the emerging importance of the third mission in HEIs. Since 2000, there has been a notable shift in the orientation of academic staff towards increased application of research results and greater societal relevance. Changes in national funding

and grant schemes, as well as the support for transdisciplinary research on global challenges in EU funding schemes have triggered this change in attitude. Effective HEI internal responses are, however, often lagging behind. Supporting students and graduates in considering venture creation as a viable career path has gained ground but so far, the focus has been more on skills development and less on start-up support.

Chapter 2 presents key review findings and recommendations. The analysis is structured along the HEInnovate framework with its seven dimensions and 37 statements. It covers a holistic approach to supporting entrepreneurship and innovation, including strategy, governance and resources, practices in organising education, research and engagement with business and society, and measuring impact. The analysis is based on a study visit to five institutions and the results of a system-wide HEI Leader survey.

Chapters 3, 4 and 5 expand on the key findings and recommendations presented in Chapter 2. Chapter 3 examines organisational capacity and mission readiness of Hungarian HEIs to support innovation and entrepreneurship. Transforming HEIs, of which many have long-standing traditions, is a long-term process and not free of barriers. Decreasing public funding for higher education is coupled with decreasing numbers of students and graduates. The current administrative and academic structures, core institutional funding and the allocation of staff time are still oriented towards a dual mission model. The chapter explores current strategies and practices to further anchor entrepreneurship, innovation and engagement with the wider world and provides recommendations and learning models on how strategy, resources and support structures can create and sustain synergies across the HEI's different functions.

Chapter 4 provides an in-depth discussion of the challenges and opportunities and suggests that the HEIs should not shy away from becoming "pioneers" in the sense that they actively promote and reward entrepreneurship, innovation and engagement with the wider world by aligning strategy with operational day-to-day practice. Students, researchers, administrative staff, academics and the HEI leadership, as well as the general public, lend increasing support to the HEI's role in enhancing knowledge exchange with a general trend towards the Knowledge Society. The chapter explores current strategies and practices to organise knowledge exchange across the HEI and provides learning models on effective support structures.

Chapter 5 reviews entrepreneurship support in HEIs. Education activities that provide for a confluence of theory and practice are an ideal environment to nurture innovation and entrepreneurship. In the classroom, however, it often happens that theory takes over, leaving little room for experiential learning. Proximity to scientific knowledge and this type of support is often the reason why student start-ups want to stay as close as possible to their academic environment. The chapter explores current strategies and practices to support entrepreneurship in HEIs and provides learning models on how best to involve students and effectively embed support measures offered by the HEI within the wider local start-up support ecosystem.

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Executive summary

Study context

Entrepreneurship and innovation in higher education institutions (HEIs) are no longer exclusively associated with business start-ups and technology transfer but are increasingly understood as core elements of a procedural framework for how the institution and its key stakeholders behave. For example, how staff and leadership nurture links between disciplines, the role of students in education and their involvement in research activities, how partnerships evolve to raise relevance and impact, and how the HEI supports nascent entrepreneurs. All of this is closely linked with what is often called the "third mission", that is, the aim to apply and transform knowledge for economic, social and cultural development in the local economy, the country or on a global scale. Ideally, the third mission enhances education and research and is not perceived and organised as a separate function – that is, engagement with the wider world – of the HEI.

In Hungary, the third mission has received increased attention over the last decade, both from public policy actors and HEI leadership. This has triggered an incremental change process in organisational culture towards the forward looking and value-creating utilisation of resources. The aim ahead is to embed this new approach to knowledge, innovation and entrepreneurship across the HEI, and to involve students and staff. This report presents evidence-based analysis of the current strategies and practices in HEIs towards this aim.

Key findings

Public policy has played an important role in introducing entrepreneurship, innovation and the third mission in Hungarian higher education. An important driver at the institutional level was the need to generate additional sources of income to compensate for decreasing public funding. This has affected the overall approach to the third mission with a greater focus on commercialisation and less emphasis on mindset development and forms of knowledge exchange without direct revenue streams, such as community engagement of staff and students. The Higher Education Strategy has raised stakeholders' awareness of the impact of the third mission on economic, social and cultural development, but it does not provide a definition of third mission activities nor does it foresee allocation of funding or staff time.

The high level of autonomy of departments and faculties has led to the creation of several "islands" where it is easier to promote entrepreneurship, innovation and the third mission than in the rest of the HEI. Central technology transfer offices have a leading role in supporting commercialisation and venture creation. To strengthen and expand these initiatives, a much greater anchoring of them in strategy, resources and support structures will be needed to create and sustain synergies across the HEI's different functions. Inclusive

communication within and beyond the HEI on strategic directions, priorities and the opportunities for staff and students to contribute to entrepreneurship, innovation and the third mission will be important.

Transforming Hungarian HEIs, of which many have long-standing traditions, is a long-term process and not free of barriers. Their current financial situation is weak and decreasing public funding for higher education is coupled with decreasing numbers of students and graduates. The current administrative and academic structures, core institutional funding and the allocation of staff time are still oriented towards a dual mission model. Moreover, the restructuring of the higher education sector, with the separating and merging of entire institutions and faculties, is placing significant stress on many HEIs, their students and staff.

Approaches to teaching are broadening. Key drivers have been the gradual inclusion of the entrepreneurship competence into defined learning outcomes, the introduction of extra-curricular learning opportunities and dual Bachelor programmes. However, the overall approach to teaching is still very much focused on frontal teaching. There is room to increase the practice dimension and to make courses and study programmes more interdisciplinary, so that students get exposed early to different knowledge bases and different ways of thinking which will develop their aptitude to work in multidisciplinary teams and sharpen their problem-solving skills.

Interest in venture creation among students, graduates and young researchers is quickly growing and the HEIs are responding to this. The increase in entrepreneurship education activities will need to be gradually matched with tailored start-up support. The current focus is too much on spin-offs and technology entrepreneurship. That alumni are not very engaged with their HEIs in Hungary is a missed opportunity for the entrepreneurial agenda. Internationalisation, particularly the recruitment of students, is very important for Hungarian HEIs. The presence of international students is, however, also a widely untapped opportunity.

Overall, the HEIs do not systematically monitor and evaluate their entrepreneurship support and third mission activities. A basic set of metrics is collected on start-up support services and there are efforts to track and measure third mission activities. However, the information collected is not used in a systematic way to the impact of entrepreneurship, innovation and the third mission.

Key recommendations

For public policy action

- Develop a common definition of the third mission in higher education institutions.
- Introduce viable funding mechanisms for the third mission in higher education institutions.
- Stimulate collaboration between higher education institutions in strategic areas.
- Strengthen the support infrastructure for venture creation in and around higher education institutions.
- Facilitate the establishment of consultative and collaborative fora at the local/regional level to enhance the impact of entrepreneurship, innovation and the third mission.
- Build a common information and data framework for the impact of entrepreneurship, innovation and the third mission.

For higher education institutions

- Develop a common understanding of the third mission and the entrepreneurial agenda specific to the HEI's profile and expectations.
- Appoint a senior manager with responsibility for entrepreneurship, innovation and the third mission.
- Introduce viable resource allocation mechanisms to support entrepreneurship, innovation and the third mission, including incentives, an innovation fund and horizontal support services.
- Introduce professional development and mobility programmes for staff related to entrepreneurship, innovation and the third mission.
- Enhance the involvement of students and young researchers in entrepreneurship, innovation and the third mission.
- Provide basic support for new venture creation, well-embedded in the wider start-up ecosystem.
- Build capacity at institutional and individual levels to understand, document and measure impact.

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Chapter 1

Overview of the Hungarian higher education system

This chapter provides an overview of the Hungarian higher education system and highlights key challenges and development opportunities resulting from recent policy developments. The chapter also describes the multiple roles of the higher education institutions (HEIs) in the country's research, development and innovation (RDI) and the emerging importance of the third mission in HEIs. Since 2000, there has been a notable shift in the orientation of academic staff towards increased application of research results and greater societal relevance. Changes in national funding and grant schemes, as well as the support for transdisciplinary research on global challenges in EU funding schemes have triggered this change in attitude. Effective HEI-internal responses are, however, often lagging behind. Supporting students and graduates in considering venture creation as a viable career path has gained ground but so far, the focus has been more on skills development and less on start-up support.

Introduction

Over the last three years, Hungary's economy has demonstrated a solid growth performance. Inward foreign direct investment and European Union (EU) funds have been the main investment drivers and Hungary is one of the few countries for which the 2012 Community Innovation Survey noted an increase in firm-level innovation activities, although growth occurred largely outside the domestic small and medium-sized enterprise sector. Only 10.6% of firms with less than 50 employees in the country reported carrying out innovation activities in contrast to 28.7% for the EU-28 average. The country is performing well in terms of value added in high-tech and in medium-high-tech manufacturing. The share of persons with tertiary education employed in high-tech and medium-high-tech manufacturing reached 6.4% of total employment in 2014, outpacing the EU average (5.3%). The situation is similar for the knowledge-intensive high-tech services: Hungary (6.1%), Czech Republic (7.7%), Slovakia (7.2%), and EU average (5.7%) (Dőry and Slavcheva, 2015). The European Innovation Scoreboard (2016) noted growth in R&D expenditures in the business sector (10%) and community trademarks (8.1%).

All this has raised the demand for high skilled workers (OECD, 2016). Sustaining the development path of Hungary's economy will require structural reforms in higher education and the research, development and innovation (RDI) system, as well as effective mechanisms to build synergies between the two.

The fall in unemployment to 6.4% (Q3/2015) was the result of a rapid expansion of the public works scheme, cross-border mobility of job seekers and job creation in the private sector, which picked up in 2013 (EU, 2016). At the same time, labour market exclusion of disadvantaged groups remains a major challenge for inclusive development (EU, 2016). Developing an effective lifelong learning system for the working age population,[1] which addresses the needs of different age groups, also in terms of re-entry into formal education, is a key policy priority. In 2014, the government adopted a new lifelong learning strategy to the year 2020 and a new law on adult training. Both are expected to raise the take-up, quality and portfolio of training courses, and to bring greater visibility and acknowledgement of results for learners.

As part of the Europe 2020 indicators, Hungary reached its target of 34.1% tertiary attainment in the age group 30-34 years in 2014 (from 26.1% in 2010).[2] Enrolment in tertiary education has nearly quadrupled since 1991 and boosted enrolment rates in the age group 20-29 years to 26%. This has, however, not resulted in higher tertiary graduation rates. Less than half of all students are graduating within the required time, and the completion rate is one of the lowest in the OECD. Salient factors are insufficient academic preparation prior to enrolment and slow study progression (OECD, 2016).

The prevailing approach to teaching in higher education is content-centred and leaves little space for experiential pedagogy, knowledge application and problem solving. Employers' main critique of graduates is that they are not sufficiently prepared for today's jobs, which require the solving of non-routine problems and the effective handling of

unfamiliar situations. The foundations for this are actually missing in earlier levels of education. The average performance of Hungarian 15-year-old students in basic skills in the Programme for International Student Assessment (PISA) 2012 was below the EU average and the proportion of low-achievers has increased. Large performance gaps are already visible at 6th grade (12-year-olds) and become prominent at 10th grade (16-year-olds). The influence of socio-economic background and school location (urban vs. rural) on educational performance is one of the highest in the EU. Most low achievers live in the north-east of the country, which is hit strongest by poverty and has the highest early school leaving rate (OECD, 2016).

Employment outcomes for higher education graduates are mixed. On the one hand, their unemployment rate is half the national average and employers highly reward education credentials. For example, a 25-34 year-old degree holder can expect to earn on average 78% more than an employee from the same age cohort with only secondary education. On the other hand, graduation rates increase mainly in study areas with low or decreasing employment growth rates. This has led to a mismatch between offer and demand. In particular, the undersupply of highly-skilled professionals for jobs in engineering and science has become a major issue. In 2013, the percentage of new graduates in science and engineering at levels 5 and 6 of the International Standard Classification of Education (ISCED) per thousand population aged 25-34 in Hungary was 9.6%, well below the EU average of 16.3% (OECD, 2016). However, the over-representation of science and engineering graduates among Hungarian expatriates also points to an inability in the national economy to absorb these graduates, and low and insufficient degrees of job quality (Dőry and Slavcheva, 2015). In social sciences, humanities and agriculture the oversupply of graduates pushes many young job seekers to accept jobs that are not related to their educational background.

Supporting students and graduates to consider starting up a business as a viable career path thus gains ground as an objective in many higher education institutions (HEIs) across the country. So far, this has been mainly associated with skills development and less with the provision of tailored start-up support. The 2012 Higher Education Act explicitly states that the "the provision of financial and business skills linked to the knowledge-based economy" shall be organised in line with core activities. Several attempts have been undertaken to integrate the development of these skills into all study programmes (Kovacs, 2016).

Introducing curricula changes in higher education to enhance the development of creativity, problem solving, teamwork, intercultural and communication skills in all programmes, will take some time to become effective. The 2014 Higher Education Strategy points out key areas for policy action around teacher training, closer interaction with the local labour market and community, and new forms of vertical and horizontal partnerships in HEIs to build and nurture synergies between education, research and third mission activities (Hungarian Government, 2014).

Higher education in Hungary

Higher education providers

Approximately 2.3 million Hungarians belong to the age group 18-34 years (2011 census[3]). Across the country there are 53 accredited HEIs, of which 28 are universities (21 state-owned), 7 universities of applied sciences (5 state-owned), and 18 colleges of

education (3 state-owned). This includes several foreign HEIs, which offer degree programmes in the country (Oktatas, 2017).

The Higher Education Act of 2012 regulates the establishment and operation of all HEIs. The state-owned HEIs are accountable to, and receive funding from the Ministry of Human Capacities, whereas non-state HEIs can be founded by churches, business organisations and foundations. All universities are authorised to offer Bachelor and Master programmes, as well as doctoral programmes in at least two fields of study. They are required to have at least three faculties, at least half of their teaching and research staff[4] must have a doctoral degree, and they must have the capacity, in some programmes, to offer courses in foreign languages. Universities of applied sciences can only offer Bachelor and Master programmes, vocational training, as well as post-graduate specialist training, which does not lead to a higher education degree. The required share of doctoral degree holders among teaching and research staff is, at one-third, significantly lower than in universities (Kovacs, 2016).

In 2010, five universities were awarded the title "research-intensive university" by the Ministry of Human Capacities. These are the Budapest University of Technology and Economics, Eötvös Loránd University, Semmelweis University, the University of Debrecen, and the University of Szeged. The award was linked to additional funding. Furthermore, the following seven universities were formally acknowledged as excellent universities: Corvinus University of Budapest, Szent István University, University of Miskolc, University of Pannonia and University of Pécs. The excellence award takes into consideration achievements in education and research, outstanding scientific results in more than one discipline, presence and upward mobility in international rankings and notable participation in international student mobility programmes (Deloitte, 2014).

In terms of geographic spread and attractiveness, the HEIs located in Budapest appear to be the preferred choice of students (Hegedős, 2015). They absorb almost half of the newly enrolled students, including an over-representation of students from elite high schools. HEIs elsewhere in the country have regional catchment areas which are based on geographical location and specialisation of study programmes.

The 2014 Higher Education Strategy brought forward the restructuring of the country's higher education system with mergers and separations of faculties, as well as a transformation of the former colleges into universities of applied sciences (Hungarian Government, 2014). Examples relevant to the case study HEIs of this review are the Eszterházy Károly College (EKF) in Eger which became a University of Applied Sciences in 2016 after having incorporated the Károly Robert college (in Gyöngyös), and the Pedagogical Faculty (in Jászberény) of the Szent István University as new faculties. The Veterinary faculty of the Szent István University became an independent University, and two faculties of Corvinus University in Budapest were incorporated into the Szent István University.

Students

Between 2005/06 and 2011/12, the total number of students in Hungary fell by 13% (European Commission, 2015a). In order to sustain the country's upward development in the tertiary education attainment rate, admission rates need to stabilise on an upward trend, and the high drop-out rates in some fields call for effective counter measures. Improvement is also needed in study orientation and career counselling (OECD, 2016). A competency test was recently introduced for newly admitted students. Results will guide the development of catch-up courses and mentor programmes (Kovacs, 2016). The new admission measures,

however, bear the risk of narrowing access to higher education (EU, 2016). Admission measures need to be complemented with effective support measures to raise the progression and completion rates of students. Application rates to higher education from students in upper secondary vocational education are going down, and pupils from disadvantaged backgrounds could tend to apply to programmes and institutions with lower admission requirements to raise their chances of admission. For example, it is relatively easy to get into engineering and IT programmes as admission points are relatively low compared to other programmes, but drop-out rates are very high (Megyeri and Berlinger, 2015).

The 2015 Active Youth in Hungary representative student survey found that family background, in particular the parents' level of education and the students' place of residence, largely determine the educational attainment of students (Szabo, 2015). The survey also provides information about the financial situation of students. Two-thirds of full-time students receive financial support from their parents, and 41% have a paid job besides their studies. A study of the motivation of students to work found that 54% stated "to gain experience in the labour market" as a motivation; 39% had a job which was closely or very closely related to their field of study (Orr, 2016). Hence, experiential learning undertaken by students on their own and outside lecture halls seems to be well established as a phenomenon, but not integrated or formally recognised by the higher education system. The recent introduction of dual education programmes (see below) is thus an important step to provide students with formal opportunities to gain contemporaneously practice-based know-how, work experience and academic knowledge.

A commendable pilot initiative to widen participation in higher education for students from disadvantaged groups is Bridge into Higher Education, a small-scale programme piloted in 2013/14 by researchers from Corvinus University (Megyeri and Berlinger, 2015). Key aims were to "demystify" higher education, raise students' aspirations, and improve their performance in Mathematics and English language. Beneficiaries were secondary school students in their final year, from very-low income families, with a strong ambition to enter higher education, as well as tertiary students who wanted to improve their performance. Findings suggest that face-to-face consultations, work in groups and regular feedback are the most effective teaching methods. University mentors were found to play an important role in lowering mental barriers.

Efforts to raise graduate employability

More efforts are needed to provide prospective students with information on employability and market returns of their educational choices. In 2012, the Higher Education Information System (FIR) was restructured and expanded into a holistic management information system, fed into by every HEI. FIR connects the data from HEIs with the student loan centre, the national tax office, the labour office and other relevant databases. The Educational Authority report the official statistics to the Ministry of Human Capacities, who, in turn, provide the national Statistical Office with the necessary input to produce further statistics on the Hungarian higher education sector. Some of the reported data are publicly accessible in a highly aggregated form, however access to the main database is not granted for external users.

In Bachelor programmes student workload and contact hours are high. In full-time study programmes, there are at least 300 classes per semester, with obligatory attendance from Monday to Friday. Students are expected to cover between 10-15 courses per semester of which many have only 1-3 ECTS points assigned. This results in a high number of contact

hours. Consequently, teaching is often organised in the form of traditional lectures and frontal teaching, which leaves little room for experiential learning and the application of classroom knowledge to real life cases (Kovacs, 2016).

Dual education programmes at Bachelor level were recently launched. Currently, 19 HEIs offer a total of 79 BSc programmes in engineering, natural sciences, ICT, economics and agriculture (Kovacs, 2016). Each programme includes 20-24 weeks work-based learning in a company per academic year. Students have a higher workload compared to their peers, who follow a standard programme in the same field. After an initial 13-week period the dual students start their practical experience in the companies and prepare for the first round of exams. There are up to eight weeks of practice in the autumn-winter semester, and 16 weeks in the spring-summer semester. Students apply for a dual BSc through the central entrance exam or based on their final exam points in secondary school. They also have to apply with one of the programme partner companies, who generally use a variety of recruitment channels, such as road shows, exhibitions, secondary school visits, etc. The companies select students according to their own requirements based on a personal interview. Successful applicants are informed by the end of July and start the programme in September.

Doctoral schools are widely present in Hungarian universities. Currently, approximately 173 thematic doctoral schools are organised within 28 universities (Kovacs, 2016). Doctoral schools are accredited by the Senate of the HEI and the Hungarian Accreditation Committee. Several policy measures have been put in place to strengthen the doctoral school (e.g. Research University Programme, Hungarian Talent Programme), and in 2012 a ranking of doctoral schools was introduced (Dőry and Slavcheva, 2015).[5] All doctoral students require certified competencies in foreign languages, which are tested by the doctoral school when entering the programme and upon completion.

Internationalisation plays an important role for several HEIs, particularly those with faculties in human medicine, dentistry or veterinary medicine. Recently, the internationalisation experience of twelve HEIs was reviewed in institutional audits supported by the Tempus Public Foundation (Kovacs, 2016). Key findings suggest that international mobility offers great potential to learn from international good practices and that individual contacts should be employed more strategically to strengthen institutional relationships (e.g. Erasmus Mundus), or to commence new research projects. For students, experiences gained during international mobility or from taking classes together with foreign students were found to contribute to proficiency in a foreign language and employability. Special attention should be on international students, who have studied in Hungary and are thus familiar with the language and culture. These students should be allowed to look for a job after graduation and automatically provided with a work permit if they find a job (OECD, 2016).

Resources in higher education

Investment in educational institutions across all levels is, with 4.1% of GDP, one of the lowest among OECD countries (the OECD average is 5.3%). During 2005-12, public expenditure in education decreased by 25%, whereas the OECD average increased by 18%. Between 2008 and 2012, the public expenditure per student in higher education decreased by 15%, whilst the number of students also decreased by 7%. In 2012, USD 7 405 were spent per student at tertiary level compared to the OECD average of USD 10 309 (OECD, 2016).[6]

In 2015, the total government funding for all public HEIs was EUR 492 million.[7] Latest data on the expected income for all state-owned HEIs is approximately EUR 943 million,

which includes, in order of magnitude, EU structural funds, competitive research funding and other co-funded calls, national research funding, and revenues from commercialisation and consulting activities.

The Higher Education Strategy foresees several modifications in the institutional funding of state-owned HEIs. The new funding formula takes into account the type of education, its associated costs, as well as the educational output, that is, number and level of degrees. First changes are expected for 2017. The future budget of an HEI will draw on the following sources: 50% institutional funding, 24% competitive funding, 22% own incomes (i.e. tuition fees, services), 2-4% direct R&D funding from third parties, and less than 1% from donations (Dőry and Slavcheva, 2015). This new approach to institutional funding expects a significantly increased capacity of HEIs to raise income from industry collaborations and third mission activities.

HEIs independently manage their income from commercialisation, consulting and other R&D activities with a separate account and these funds can be used for the development of educational, research and cultural activities (Kovacs, 2016). On average, this accounts for around 1.5% of an HEI's total income (Dőry and Slavcheva, 2015).

Research units in public HEIs receive formula-based funding from the HEI's budget (Dőry and Slavcheva, 2015). This funding has decreased significantly in recent years as a result of severe cuts in the institutional funding for HEIs and a reduced share of national project-based funding. Since 2015, the latter comes from the National Research, Development and Innovation Fund (NKFIA), which combines the two previously separated funding sources for basic research (OTKA) and for applied research (KTIA). For 2015, the total NKFIA budget was EUR 247 million (Kovacs, 2016).

It is estimated that half of the funding for HEIs and public research organisations is covered by competitive project-based funding. Given the importance of EU funding, a key objective is the improvement of the absorption capacity. Efforts are underway to remove management and administrative barriers and improve the capacity to prepare and evaluate

Table 1.1. **Summary overview of key facts on the Hungarian higher education system**

Population (1 Jan 2017)	9 799 000
GDP in EUR per capita (2015)	11 000
Tertiary attainment in population aged 25-64 (2015)	24.2 %
Of which	
Short cycle tertiary education	1.3%
Bachelor	13.2%
Master	9.0 %
Doctorate	0.8 %
Expenditure on tertiary education institutions as a percentage of GDP (2013)	0.9 %
Expenditure (from public and private sources) on R&D (2015)	1.39 %
Direct government budget for R&D as a percentage of GDP (2015)	0.48 %
Number of students in publicly funded higher education institutions (2015/16)	220 058
Of which:	
Universities	196 949
Universities of Applied Sciences	17 586
Other higher education institutions	
Tertiary degrees conferred (2016)	68 110
Of which:	
Degrees by universities (BA, MA, first degree, second degree)	54 309
Degrees by UAS (Bachelor, Master, Associate)	9 078

Source: Ministry of Human Capacities (2017).

funding applications, and to enhance synergy with national funding sources (EC, 2015b). During 2007-14, the HEIs had access to substantial funding from several Operational Programmes, which should have increased their collaborative capacity with industry; however, no analysis or assessment is available (Dőry and Slavcheva, 2015).

Table 1.1 provides a summary overview of key facts on the Hungarian higher education system.

Higher education policy framework

Key actors

In the following, the main government organisations and other national stakeholders with responsibilities in higher education and the country's research, development and innovation system are briefly presented as relevant to this study.

At the national level, the Ministry of Human Capacities is responsible for the country's education system from pre-school to tertiary education, except for vocational education and training. Within the Ministry of Human Capacities, the State Secretariat for Higher Education covers the higher education agenda. The Ministry's portfolio also includes youth, sports, healthcare and welfare, and the protection of cultural heritage. The Ministry for National Economy has a wide range of responsibilities for financial and economic governance areas, as well as for vocational education and training. It is responsible for the research and innovation policy and oversees three relevant Operational Programmes: Economic Development and Innovation (GINOP), Competitive Central-Hungary (VEKOP), and the Territorial Operational Programme (TOP).

The Hungarian Accreditation Committee (HAC) was established in 1993 together with the country's first higher education law (Kovacs, 2016). The HAC conducts ex-ante and ex-post quality assurance of programmes and institutions. Its main task is to ensure the quality of higher education programmes. The HAC also evaluates foreign HEIs operating in Hungary. Ex-ante quality assurance of programmes includes the national-level educational and outcome requirements, which are framework requirements for all degree programmes in Hungary. The ex-post quality assurance is conducted in five-year cycles. Based on the 2012 Higher Education Act, the HAC has 18 full members, of which eight are appointed by the Ministry for Human Capacities, three by the Hungarian Rectors' Conference, two by the Hungarian Academy of Sciences, two by the Churches, one by the Hungarian Academy of Arts, and one by the National Union of Doctoral Students. The president is nominated by these members and appointed by the Minister in agreement with the president of the Hungarian Academy of Sciences. The president and members receive their letters of appointment from the Prime Minister for a six-year term, renewable once.

The Hungarian Rectors' Conference (HRC) was established in 1988 and represents all HEIs in the country. Its primary task is to represent the higher education institutions and to protect their interests in any issue relevant to higher education at national and international levels. In this respect HRC manages the elaboration of proposals on legislative provisions, and co-ordinates the discussion process to form common positions of the Hungarian higher educational sector on significant HE issues. As a result of these activities HRC is a determinant actor in shaping relevant national public policy. By means of full membership in the European University Association (EUA) and the International Association of Universities (IAU) HRC plays an active role in the realisation and improvement of the internationalisation strategies of the Hungarian HEIs. In the framework of the professional

working groups of the EUA, HRC is also forming perspectives of research and innovation activities in the European Higher Education Area. Researchers and experts delegated by HRC to these working groups are involved in the newest developments of current HE issues, and provide useful inputs to national HE principles. By participating in EU-funded projects with different kinds of scopes HRC contributes to the development of crucial fields of EHEA, such as the enhancement of teaching quality in higher education, and addressing the present challenges of professional higher education. HRC pursues constant dialogue with international partners, as a result of which mutually fruitful international collaborations are undertaken. A good example of successful co-operation is the Brazilian scholarship programme, Science Without Borders, in which more than 2 000 Brazilian students visited Hungary under the umbrella of HRC's co-ordinating and organising activity.

The National Research, Development and Innovation Office (NKFIH), established in January 2014, is responsible for research, development and innovation. It brings together several government bodies and the two public research funding programmes KTIA and OTKA. NKFIH hosts an independent panel of external experts, which follows the smart specialisation agenda; they play a crucial role in the Horizon 2020 applications and run bilateral science and technology co-operations. The NKFIH also plays a key role in the preparation and implementation of the Operational Programmes (see below), and pre-reviews the eligibility of project proposals. The Office has, for the last decade, been involved in the panels selecting science funding proposals. Firms applying for projects can also ask the NKFIH to check the project plan, budget, and the composition of the project team prior to proposal submission.

The National Science Policy and Innovation Board was created as a policy advisory body in 2013. It is co-chaired by the Prime Minister and the president of the Hungarian Academy of Sciences. The mandate of the board is to provide advice, evaluate and make recommendations on strategic issues of scientific, research and development and innovation programmes, the sustainable finance of these programmes and the evaluation methodology to be carried out by public research organisations and HEIs (Dőry, 2014). This body was expanded in 2015 with nine distinguished members from the fields of economy and science to monitor the effective use of financial instruments available for research and innovation (Dőry and Slavcheva, 2015).

The national umbrella for the technology transfer offices in HEIs is the Hungarian Intellectual Property Office (HIPO), a government agency under the supervision of the Minister for Justice. The president is appointed by the Prime Minister and the two vice-presidents are appointed by the Minister of Justice. The HIPO collaborates with the technology transfer offices in HEIs and the Chambers of Commerce and it supports the operation of territorial centres that offer IP consultancy services and training for scientists and local firms.

The Tempus Public Foundation (TPF) is a non-profit organisation established in 1996 by the Hungarian government, with the task of managing international co-operation programmes and special projects in the field of education, training and EU-related issues. TPF is also a member of the network of Erasmus+ national agencies and information offices. TPF also operates a knowledge centre which provides structured information on education and training policies, implements projects in education policies, participates in initiatives for improving mobility and other internationalisation measures, organises thematic conferences, compiles professional publications, and implements joint actions with partner

organisations. It also offers a wide range of its training courses, and operates a best practice database on innovative educational tools and digital methodology in education.

As an implementing agency for European, multilateral and bilateral educational programmes, the main goals of the Foundation are: supporting initiatives aiming at the modernisation and quality improvement of education, training and human resources development; encouraging international co-operation and mobility; and strengthening the European dimension in these fields. Activities include management of scholarships for incoming and outgoing students and staff, support for co-operation programmes, and capacity building activities for HEIs. TPF provides assistance and consultancy services; organises training courses, info days, conferences and joint actions with partner organisations; and publishes research studies, dissemination materials, and best practice publications.

Recent policies

The national higher education strategy "A Change of Pace in Higher Education"

The 2014 national higher education strategy "A Change of Pace in Higher Education. Guidelines for Performance Oriented Higher Education Development", sets the agenda up to 2030 (Hungarian Government, 2014). The key objectives are to establish a performance-based higher education system, boost the research element of higher education and introduce a career system for researchers; and to strengthen links between HEIs and businesses. The strategy foresees several major changes in the internal governance structures of HEIs, content and structure of study programmes, and access to higher education (Hungarian Government, 2014). The following performance indicators were set in the new strategy: i) cost of teaching by specialisations, ii) cumulated number of credits, iii) increase of the competency level of students, iv) number of diplomas, v) drop-out rates, and vi) research achievements in terms of number of publications in foreign languages, technology transfer projects, patent applications, doctoral degrees awarded, scientific prizes (Dőry and Slavcheva, 2015).

Two major changes to the HEI internal governance structures have been introduced: i) the position of the chancellor, who is in charge of the non-academic management of an HEI, and ii) a consistory, which involves three external stakeholders (besides the rector and the chancellor), appointed by the Ministry of Human Capacities, in strategic decision making processes, including adopting the medium-term institutional development plan and the RDI related strategy, the annual budget and report, as well as asset management plans and the establishment of a business entity (Kovacs, 2016).

The rationale for the introduction of the chancellor was to enhance the HEI's professional management capacity. As stated in the Higher Education Act of 2012, the chancellor is responsible for "the economic, financial, controlling, accounting, employment, legal, management and IT activities of the higher education institution, the asset management of the institution, including the matters of technology, institution utilisation, operation, logistics, services, procurement and public procurement"; and responsible for the employment of all non-academic staff. The chancellor is appointed by the Prime Minister, following a job description drafted by the Ministry of Human Capacities, to which he/she is also accountable. According to Kováts (2015) there is as yet no functioning mechanism in place to "resolve conflicts between the chancellor and the academic leadership (rector), […] the chancellor's external and internal legitimacy is [sic] uncertain, not to mention the strong tendencies inherent in the system to erode his internal legitimacy". In a system where

limited and decreasing funding (see below) has introduced a certain degree of tension, conflicts over the allocation of resources and the identification of strategic development areas are likely to emerge.

By 2020 the number of study programmes in higher education will be cut by 15% (Hungarian Government, 2014). At the same time, launching new programmes will become easier, however, implying stricter monitoring and evaluation of quality and outcomes. This includes the above-mentioned dual education bachelor programmes for which a Dual Training Council with representatives of government, HEIs, chambers and companies was established to co-ordinate the dual education programmes. Companies that offer placements can deduct the cost of trainees from their vocational training tax contribution, and receive financial resources for training equipment (EU, 2015). This practice has been in place for some time.

More pathways into higher education will be created for secondary school and mature learners (Hungarian Government, 2014). For the latter, work experience and prior non-formal learning will be recognised in the higher education entry requirements. Furthermore, higher education centres for community based studies will be opened in remote areas. For secondary school graduates an intermediate level of foreign language command will be required for all HEI programmes by 2020, with the exception of short cycle vocational programmes. These pathways into higher education have already been partially introduced with the new higher vocational education and training system. From the 2013/14 school year onwards only HEIs can launch these programmes after secondary school, which is reflected in the change of the name of the programme (from advanced to third-level vocational education and training). Graduates can transfer up to 75% of all the credits gained (between 30-90 credits) to a Bachelor programme in the same field.

The "Investing in the Future 2020" strategy

The Investing in the Future 2020 strategy follows the Science, Technology and Innovation Strategy (2007-13). In a seven-year time period it seeks to address key persistent challenges in the innovation system, which result from shortcomings in technology transfer and knowledge exchange, internal weaknesses in knowledge production in HEIs and public research organisations, and the low knowledge absorption capacity in the domestic business sector. The overall target is to raise the research and development (R&D) intensity rate from 1.4% in 2015 to 1.8% of GDP by 2020.[9]

Several specific measures, such as the National Talent Programme, have the following set of objectives: i) strengthen higher education attainment rates in sciences and engineering, ii) facilitate temporary mobility of researchers into industry, iii) offer continuous professional development in innovation management, project management and intellectual property rights, (iv) strengthen the entrepreneurial culture of researchers and students, iv) improve the accessibility of scientific databases, and v) enhance international co-operation and participation in scientific networks (Dőry and Slavcheva, 2015).

The role of higher education in the country's research, innovation and development system

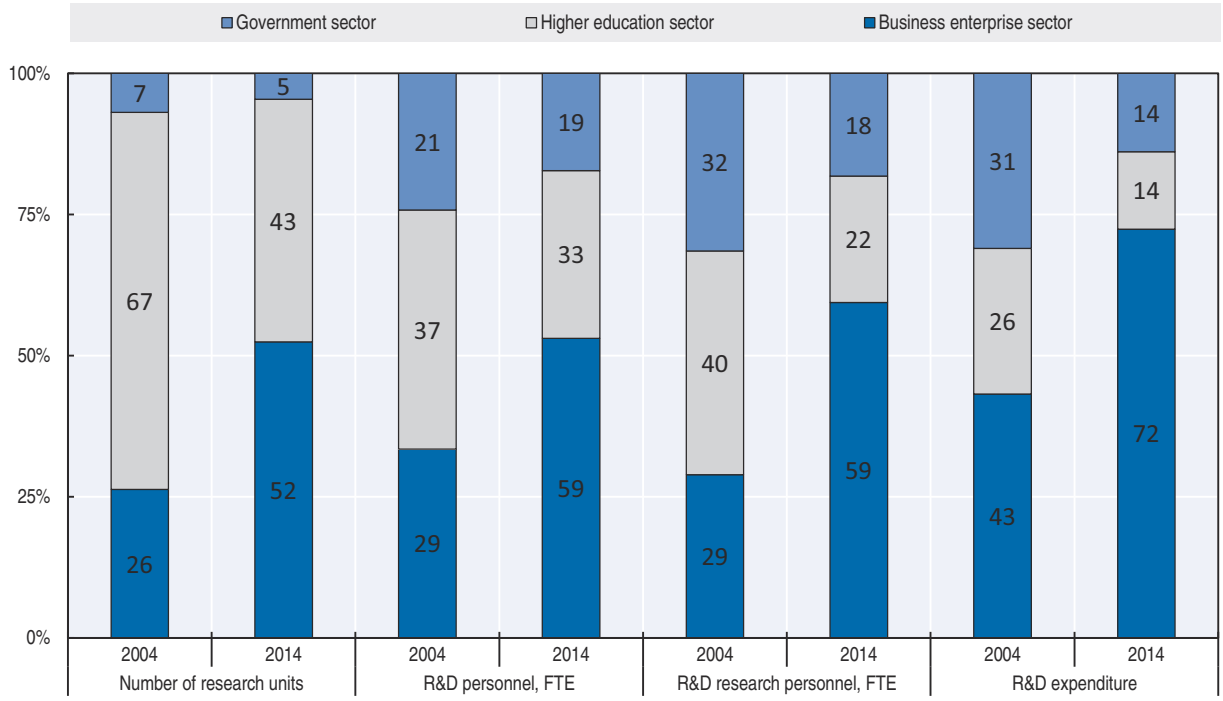
Key challenges in the country's RDI system are the low rate of innovation activity in domestic firms, gaps in the supply of human resources, and a lack of functioning interfaces for enhanced co-operation between HEIs, PROs and businesses (Dőry and Slavcheva, 2015).

Regarding the role of HEIs in the RDI system, an underlying issue, however, of salient importance is the dominant perception of linearity of research and innovation and "a stronghold of 'basic research', where 'applied research' is regarded with scepticism and mistrust" (European Commission, 2015b). This also manifests in the isolation of research units due to their narrow disciplinary research orientation and a lack of opportunities to participate in transdisciplinary research initiatives. This could be partly explained by the long existence of two distinct funding streams for basic and applied research and the dominance of the traditionally grounded Hungarian Academy of Sciences in non-HEI research (ibid.).

Two important initiatives to strengthen the role of HEIs in the RDI system are the "Momentum" and "Visiting Scholar" programmes (Dőry, 2014). The aim is to raise the efficiency and effectiveness of scientific research through greater exchange with international networks and leading scholars, a start-up ecosystem around HEIs, and measures to raise the absorptive capacity of incumbent firms. More could be done to attract young and mid-career professionals from companies into HEIs and public research organisations – (lower salaries are an obvious barrier) – and to strengthen professional research management support and skills.

According to latest available data, in 2013 the business sector employed more than half of all full-time equivalent (FTE) researchers (57.2%); 23.7% worked in HEIs and 19.1% in public research organisations (Dőry and Slavcheva, 2015). The largest research units were located in public research organisations with on average 60 scientists, whereas research units in private firms have twice as many researchers per team than HEIs (Figure 1.1).

Figure 1.1. **Distribution of key research and development resources in Hungary (2004, 2014)**



Source: Kovacs (2016) based on National Statistical Office.

Businesses, especially large enterprises and multinational corporations located in the Central Hungary region, employ approximately 60% of all researchers. Other regions lag behind but still show a substantive increase. During 2004-10 the number of researchers in all sectors increased by a factor of 2.8 in Eastern Hungary and 2.6 in Western Hungary (European Commission, 2015b). Looking into company size, the greatest increase in the number of R&D personnel can be noted for micro- and large enterprises, which almost doubled their average number of researchers in the period 2001-10, while medium-sized companies showed no increase (National Innovation Office, 2012 cf. Kovacs, 2016).

Academic staff in HEIs can be deployed for up to one-third of their time for research activities. In order to raise the R&D capacity in HEIs, young researchers on assistant and associate professor posts received a 15% salary increase in 2016. Doctoral students now receive higher scholarships plus an additional year to complete their studies (within a total period of four years) (Dőry and Slavcheva, 2015).

The recently started R&D Workshop Excellence programme, with a budget of EUR 141.9 million, seeks to strengthen research units in HEIs by releasing researchers from their teaching duties and creating new positions for young researchers (Dőry and Slavcheva, 2015). This also includes the introduction of fixed-term post-doctorate positions, which hitherto did not exist. It is expected that these positions will allow early-career researchers to find a position in Hungary and keep them from moving aboard (Dőry and Slavcheva, 2015).

Except for bibliometrics, there is little quantitative information on the performance of intersectoral R&D collaboration. Scopus data shows that in the period 2003-13 there was almost no change in the percentage of academia-industry co-publications; which in 2013 were, with 1.4%, below the EU-28 average of 2.2% (Dőry and Slavcheva, 2015). Co-publications mainly cover research in areas of energy, immunology and microbiology, health related professions, pharmacology, toxicology and pharmaceutics. Since Hungary's accession to the European Patent Office in 2003, the number of national patent applications has decreased from 4 810 (2003) to 619 (2014). The regional distribution of patent activity is largely concentrated around Budapest and the Central Hungarian region (Kovacs, 2016).

Education related collaboration with businesses and industry

Across the country, several multinational corporations have established long-term relationships with HEIs (Deloitte 2014). Five examples are briefly presented below:

- 20 years ago, Ericsson Telecommunications Hungary started collaborations with several departments of Budapest University of Technology and Economics (BME) and ELTE University, two large universities located in Budapest. Students, mainly in MSc and doctoral programmes work together with their research supervisors and company R&D staff on jointly identified research questions in software and hardware development and microwave networks. Temporary employment contracts are offered for PhD students to collaborate in research projects.
- In 2005, the Robert Bosch Group established the Department of Mechatronics at the University of Miskolc. The choice was motivated by the University's educational profile in mechanical, electrical and computer engineering, and economics, and its proximity to four Bosch Group factories, two of which are located in Miskolc. The collaboration is based on experiential education and joint research activities in the field of mechatronics. Outstanding students can apply for the Faculty Memorial Medal and the Bosch Award.

- A similar collaboration developed between the Széchenyi István University in Győr and Audi Hungary Ltd. in 2007 with the establishment of the Department for Internal Combustion Engines. Engineering students are trained in the tribology of internal combustion engines. The collaboration, which is supported by the Municipality of Győr, was formally recognised as a role model for the FIEK policy initiative (see below).
- In February 2009, Dunaújváros University of Applied Sciences and Hankook Tire Hungary Ltd. started a joint Rubber Technology Engineer programme, which provides engineers with theoretical and practical knowledge of tyre manufacturing. Training sessions are organised on campus and in the factory. Hankook engineers are educators in the programme.
- In 2011, Kecskemét University of Applied Sciences signed an agreement with Mercedes-Benz Manufacturing Hungary and Knorr-Bremse to establish a dual vocational training programme in mechanical engineering following the German model. The Kecskemét City Council and the Chamber of Industry and Commerce are also involved. The initiative became a blue print for the recently started and above-mentioned dual education programmes at Bachelor level.

Industry collaboration at the level of individual HEIs has been taken to the next level with the following two policy initiatives: The Higher Education and Industry Collaboration Centres (FIEK) and Open Laboratories. The FIEK Centres are expected to play a major role in establishing a broader territorial co-operation between HEIs and local industry and businesses. FIEK partners shall play a crucial role in the development of programme and course curricula. This is linked with the dual education initiative. The aim of the Open Laboratories initiative is to open up public research laboratories, as well as corporate labs, for companies, in particular small and medium-sized enterprises (SMEs). It is expected that, as a result of their involvement in an open laboratory, non-innovator firms will commence an innovation activity. FIEK has its roots in the Co-operative Research Centres and Regional Knowledge Centres at Universities (RET), which aimed at strengthening pathways for the commercialisation of research results. All five HEIs that were visited as part of this review benefitted from this (Table 1.2).

Table 1.2. **Examples of Co-operative Research Centres and Regional Knowledge Centres in the case study HEIs**

HEI	Year	Research/industry areas	Funding (million HUF)
University of Debrecen	2004	Genomic, nanotechnological and biotechnological applications	1 700
Semmelweis University	2004	Molecular and info-bionic research in medical sciences	1 600
Széchenyi István University	2005	Automotive industry	1 100
Szent István University	2005	Natural resources, environmental protection	500
Eszterházy Károly University of Applied Sciences	2005	Consumer focusing complex traceability systems, new food safety parameters and devices with new info-communication systems	800

Source: Kovacs (2016).

Policy initiatives that seek to enhance HEI-industry collaboration and to raise the absorptive capacity of SMEs need long-term implementation commitment to be effective, as they require the establishment of organisational structures and procedures. Critical voices pointed out that policy initiatives have kept changing content, direction and actors, which resulted in discontinuity of successful measures and introduced overlap (Deloitte, 2014). A multi-phase approach that includes selection, evaluation and replication or continuing of effective measures could help here. Such an approach guides the Operational

Programmes for the period 2014-20. Table 1.3 provides an overview of the most relevant measures and calls in the Operational Programmes for economic development (GINOP) and competitiveness for Central Hungary (VEKOP).

Table 1.3. **Overview of RDI relevant measures and calls in the Operational Programmes 2014-20**

Measure	Main objective	Foreseen budget (2014-20) (in million EUR)
Support for RDI activities of companies	Support the development of prototypes, new products and services.	183.00
R&D competitiveness and excellence co-operations	Collaboration between domestic companies, research units and HEIs to enhance exploitation and commercialisation of scientific research results.	161.30
Strategic R&D workshop excellence	Strengthening the R&D capacities of strategically important research units to achieve world-class research results.	146.67
Higher Education and Industry Co-operation Centre (FIEK)	Establishment of a collaboration infrastructure to strengthen Hungary's RDI system and in particularly the role of HEIs.	80.60
Development of prototypes, products, technology and services	Applicants should carry out experimental research (40% of costs) and the development should result in a new product or service either in demonstration phase or market entry.	64.50
Strengthening the research infrastructure, internationalisation and networking	Development of internationally competitive knowledge centres, participation of Hungarian researchers in international research networks (particularly in Horizon 2020 projects).	73.30
Innovation ecosystem	Support the operation of business incubators and enhance the performance of tenant companies.	16.13
Innovation vouchers	Vouchers for start-ups and SMEs to be used for temporary innovation consulting services and innovation support services, also to enhance collaboration with knowledge centres.	10.00
IP protection	Support of intellectual property rights protection at national and international levels, including patent search and fees.	3.33

Source: RIO (2015).

Higher education engagement with the wider world

Since 2000, there has been a notable shift in the orientation of academic staff in Hungarian HEIs towards increased application of their research and greater societal relevance (Novotny, 2010). Changes in national funding and grant schemes, as well as the support for transdisciplinary research on global challenges in EU-funding schemes (e.g. Horizon 2020), have triggered this change in attitude. Effective HEI-internal responses are, however, often lagging behind. Efforts are needed to raise awareness of students and staff and provide horizontal support services, for example in research grant management.

The 2014 Higher Education Strategy assigns third mission activities in HEIs a central role and raises stakeholders' awareness of the impact of knowledge exchange for economic and social development. However, no clear definition is given of what third mission activities entail. The study visits to five HEIs confirmed that a narrow definition, with a focus on commercialisation of research results through existing companies and newly created firms (mainly spin-offs by HEI staff) prevails, particularly among HEI leadership, faculty heads and staff involved in research. Third mission activities, however, cover much broader dimensions of development. For example, as environmental problems become increasingly difficult to tackle without scientific advice, demands for involvement of HEIs are also articulated in political arenas and through not-for-profit organisations, social movements or foundations that are increasingly linked to universities (OECD, 2011).

Third mission activities are considered as literally a "third" set of activities on top of education and research, and staff perceives it as difficult to make space for these activities on top of their daily workload. Respondents in a representative survey of more than 1 500

academic staff in engineering, natural sciences, medicine and health sciences, and agriculture departments from 14 HEIs found it very hard to deliver equally well on both education and research, particularly as the latter is the basis of their performance evaluation. This conflict is particularly evident for those who aim to meet the expectations of students and their academic peers (Novotny, 2010).

Looking into the framework conditions for third mission activities in Hungarian HEIs, the pre-peer review report (European Commission, 2015b) pointed out a number of barriers, which can be grouped into i) the wider ecosystem, ii) HEI culture, and iii) HEI support structure.

- *Wider ecosystem*:
  - Few/weak connections between RDI actors
  - Lack of support for technology transfer and entrepreneurship
  - Ineffective Regional Innovation Agencies
  - Weak private sector demand for technology transfer
  - Low internationalisation of domestic firms
- *HEI culture*:
  - Narrow understanding of the third mission as a third set of activities apart from education and research
  - Little/no space for entrepreneurship as a key competence in curricula
  - Difficulty in changing mindsets, persistence of old patterns
  - Deep lack of trust
  - Few multidisciplinary projects; lack of co-operation between departments or different HEIs
- *HEI support structure*:
  - Virtually no entrepreneurship education
  - Innovation in a broader sense, including responses on teaching and learning, and organisational challenges, is not high on the agenda
  - Lack of support services for technology transfer and entrepreneurship
  - No clearly defined or broadly accepted organisational structures and procedures by academic and non-academic staff
  - No critical mass in technology transfer and entrepreneurship

Technology transfer offices

Several HEIs have created technology transfer offices (TTOs) to facilitate the commercialisation of research results. Funding was available in the Operational Programme for Social Renewal for the period 2007-14), ranging from HUF 209 million to HUF 461 million. HEIs had 24 months to establish technology transfer structures (Kovacs, 2016). The programme evaluation found that the HEIs were largely not prepared to implement their ambitious plans within the time available, and instead of using the funds for pilot projects to define innovation pipelines or the introduction of a proof-of concept funding, state-of-the art reports and other studies were produced (ibid.).

Also, several intermediary organisations, such as Regional Innovation Agencies, technology incubators, foundations for enterprise promotion, etc., were established. Their contribution to raising the effectiveness of the RDI system remains low, not least because they are largely detached from the HEIs (Dőry and Slavcheva, 2015). There is agreement that

the current commercialisation support infrastructure in and around HEIs is not yet prepared to identify and act upon invention and innovation opportunities (Dőry, 2014; Dőry and Slavcheva, 2015; European Commission, 2015b).

All HEIs have their own manuals on intellectual property rights to deal with disclosure of inventions and some TTOs (e.g. University of Pecs, University of Debrecen and Semmelweis University) have established full in-house invention evaluation systems covering technological, marketing and legal aspects. Several HEIs have relied on competitive funding (often EU co-funded) to attract qualified staff. This, however, has proved to be only a short-term solution potentially risking a high turnover in staff.

The evaluation of the Operational Programme for Social Renewal found that the funded TTOs had achieved only a weak position within their HEIs (Kovacs, 2016). Several studies found that at the level of individual academics there was thus only little willingness to openly share information and that one of the most critical challenges for TTOs was to create trust-based relations (Nowotny, 2008, 2010). Certain fields of science, such as engineering, ICT and biotechnology, have a higher commercialisation potential for research results. However, the high level of autonomy of faculties and the absence of a functioning reward and funding redistribution system are likely to distort initiatives and resources for technology transfer and entrepreneurship into certain niche areas instead of enhancing their spread across the entire HEI (Novotny, 2010; Szabó, 2010).

Studies on the motivation of researchers to engage in commercialisation activities show mixed results for how important the extra income from these activities is. Whereas Novotny (2014) reported that extra income is a primary motivation for the majority of scientists in his sample, Huszar et al. (2016), proposed from their survey a combination of several motivational factors. These are, in order of importance: i) obtain financial resources for further research; ii) access to an environment that is more flexible than the university for the invention's further development; iii) increase of personal income; iv) collect industrial feedback on the applicability of the invention; v) benefits for society; vi) direct control over the commercialisation process; vii) secure jobs for young researchers in the spin-off company; viii) secure a job for oneself if university position is terminated; ix) increase social reputation; x) increase scientific reputation; xi) demonstrate the practical relevance of research to family/friends. The study by Huszar et al. (2016) also pointed to another interesting aspect, which could be followed up by specific policy measures. The majority of scientists who were successful in research commercialisation had gained some kind of managerial experience in the private sector. Temporary mobility programmes for academic staff into industry could stimulate this.

Interest in entrepreneurship and start-up support in HEIs

Interest in entrepreneurship among students and young scientists in Hungary is growing quickly. For several years, Bridge Budapest (2016) has been surveying the entrepreneurial intentions of students, young scientists and other groups of society. The 2016 edition of a representative survey of young people showed that six out of ten young people in the age group 20-35 years have concrete plans for their own business, and almost 60% of the respondents with a higher education degree stated that they know a company which was founded by a Hungarian young person and has achieved global visibility (e.g. Start-up.hu, 2017).[8] Reasons for not starting a business have changed over time. Whereas financial safety and risk avoidance have fallen to 18%, from 36% in 2015, insufficient business knowledge has remained a major start-up barrier.

The regularly survey activity of the Hungarian team of the Global Entrepreneurship Monitor also points out a growing interest in entrepreneurship. According to latest data, 16% of the surveyed population intends to start a business within the next three years. Main start-up barriers are the "unsupportive education system and negative media attention" (GEM Hungary, 2016). The study concluded that in the long run, the challenge will be to make the education system more supportive of entrepreneurship.

Only a few HEIs have on campus business incubator facilities (Dőry and Slavcheva, 2015). A major initiative to strengthen the Hungarian start-up ecosystem is the "Start-up_13" programme, launched in June 2013 with EUR 7.2 million funding. The aim is to support (high) technology start-ups and spin-offs to finally grow into dynamic international firms. It operates in multiple phases. In 2015, contracts were signed with four incubators and a number of selected projects (National Research, Development and Innovation Fund, 2016). In the first phase, innovators could get a maximum of EUR 10 000 to elaborate their business ideas if the expert committee finds the idea prosperous. In the second phase, innovators could get higher support to further elaborate their ideas, up to a maximum support of EUR 200 000 for technology and business development. In this phase, start-ups should collaborate with the technology incubators and accelerators (Dőry and Slavcheva, 2015). A new initiative was recently launched with the "Innovation Ecosystem" programme (Box 1.1).

Box 1.1. **"Innovation Ecosystem" programme**

The "Innovation Ecosystem" programme (EDIOP-2.1.5) launched in 2016 seeks to strengthen incubation facilities for start-ups and spin-offs. The state will share the high risks associated with investing in innovation-based start-ups, with the owners of incubators specialising in the development of start-ups.

Total funding per incubator is HUF 600 million (approx. EUR 1.9 million) for a three-year period and covers costs related to the recruitment of start-ups/spin-offs, mentoring, technology and business development, financing of innovative start-ups/spin-offs to market entry, as well as the organisation of events. Incubators are expected to incubate at least five start-ups/spin-offs with at least three prototype/tested products or services, and at least five public start-up events organised per year.

Incubators define their own selection criteria for start-ups/spin-offs. Only unlisted micro enterprises up to five years following their registration, which have no distributed profits and are not the result of a merger can apply as start-ups/spin-offs. They are entitled to use up to 20% of the grant to cover operating costs, and remaining funds should be transferred to beneficiaries, up to HUF 60 million (approx. EUR 193 500) for each project.

Only public/private limited companies or limited liability companies with at least HUF 5 million nominal capital are eligible as incubators. These companies are required to invest at least 20% of the allocated grant in the start-ups/spin-offs. During incubation, the incubator is therefore, because of the investment of its own funds, a shareholder, owning up to 24% of the company.

Evaluation criteria for incubator applicants include: professional experience of the management and owners of the incubator; business plan; proportion of for-profit organisations in the ownership structure; amount of nominal capital available; expected impact of the incubator on the development of the local/regional innovation ecosystem; oral presentation and assessment.

Source: National Research, Development and Innovation Office (2017).

The Budapest Runway 2.0. – A Start-up Credo, published in 2013 by the Ministry for National Economy and the National Research, Development and Innovation Office put forward several concrete proposals to strengthen support for academic entrepreneurship. Education and training, access to funding, taxation and regulation, and an enabling environment were identified as four pillars of an effective start-up ecosystem. The strategy, however, lacks a more detailed understanding of the wider role of higher education in promoting start-up creation, which clearly goes beyond offering services and facilities by putting an emphasis on the development of entrepreneurship as a key competence, that is, the ability of individuals to identify, create and act upon opportunities to create value. Instead, the strategy focuses on the start-up process, and proposes the establishment of start-up business academies for young people with short, targeted trainings and mentoring, financed mainly by private investor funds and complementary national funding. The role of HEIs in creating initiative and raising awareness is clearly missing in this.

Notes

1. Population ageing has brought the share of 55-64 year olds in the population to 21%, which is one of the highest among OECD countries.
2. The EU-28 average in 2013 was 37.7%, the 2020 target is 40%. Hungary's new Higher Education Strategy (2014) sets 35% tertiary attainment as the target for 2023.
3. The total population of Hungary is 9 937 628, according to the 2011 census.
4. This concerns all teaching and research staff members who are employed directly or on a public service employment basis.
5. In the academic year 2015-16 the Hungarian state awarded 1 270 PhD scholarships, of which 850 were in the areas of engineering, natural sciences and ICT. About 30 scholarships were reserved for (ethnic) Hungarian students living in neighbouring countries (Dőry and Slavcheva, 2015)
6. Converted from HUF into USD using 2012 purchasing power parity.
7. In comparison, the annual budget of the University of Amsterdam is approximately EUR 600 million.
8. Key performance indicators include 30 research and technological laboratories to receive global recognition, the establishment of 30 new globally embedded R&D centres, and 300 fast-growing SMEs that enter international markets.
9. Two of the most well-known examples of Hungarian start-ups are Indextools, sold in 2008 to Yahoo, and Prezi, a cloud-based presentation software founded in 2009.

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Chapter 2

Applying HEInnovate to higher education in Hungary

This chapter presents key review findings and recommendations. The analysis is structured along the HEInnovate framework with its seven dimensions and 37 statements. It covers a holistic approach to supporting entrepreneurship and innovation, including strategy, governance and resources, practices in organising education, research and engagement with business and society, and measuring impact. The analysis is based on a study visit to six institutions and the results of a system-wide HEI Leader survey.

HEInnovate describes the innovative and entrepreneurial HEI as "designed to empower students and staff to demonstrate enterprise, innovation and creativity in teaching, research, and engagement with business and society. Its activities are directed to enhance learning, knowledge production and exchange in a highly complex and changing societal environment; and are dedicated to create public value via processes of open engagement". How this can be translated into daily practice in HEIs, is described through 37 statements which are organised in seven dimensions.

The following presents key findings from the application of the HEInnovate guiding framework to HEIs in Hungary.

Leadership and governance

Entrepreneurship is a major part of the HEI's strategy

In Hungary, public policy has played an important role in introducing entrepreneurship and third mission activities into higher education. At the institutional level, an important driver has been the need to generate additional income to compensate for the decreasing institutional funding from the state. This has impacted on the conceptual understanding of entrepreneurship and third mission activities: there appears to be a greater focus on commercialisation activities and less emphasis on entrepreneurship as a competence (mindset) and other forms of knowledge exchange, such as community engagement activities, which may not have direct revenue streams.

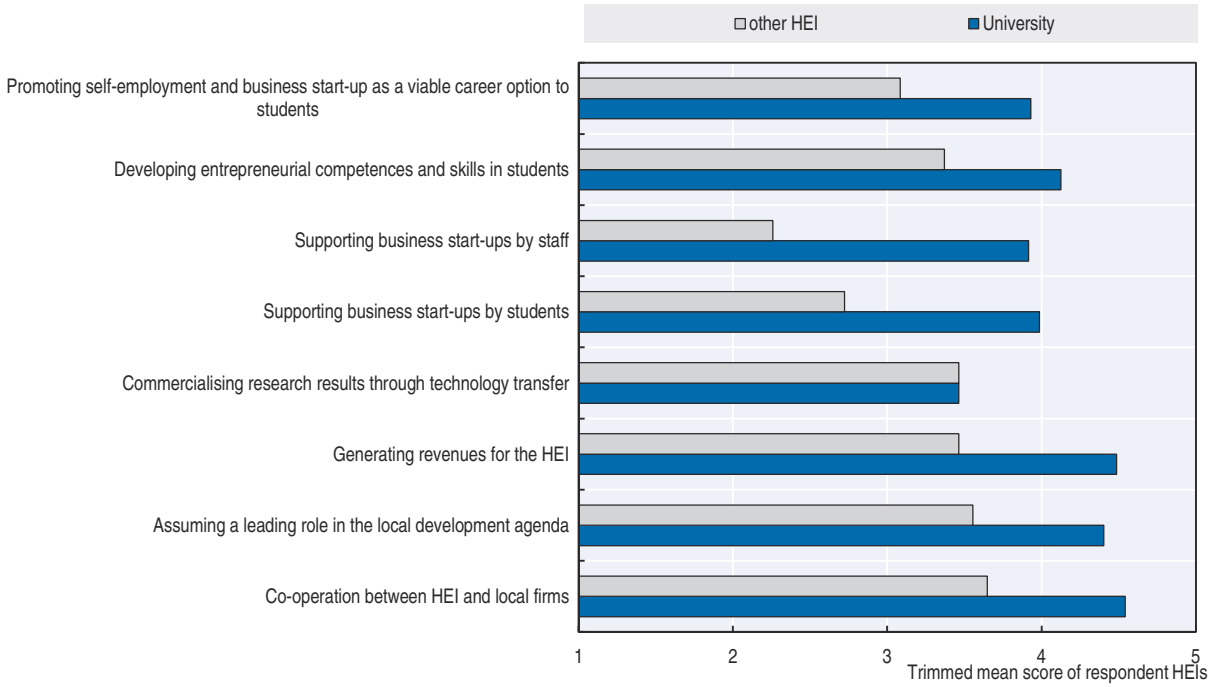
Although the 2014 Higher Education Strategy makes explicit reference to the third mission, it lacks a comprehensive definition of activities and allocation of resources in terms of staff time and funding. It is therefore recommended to develop a specific strategy on the third mission, building from the evidence of existing and planned activities reported in the HEI strategies, which are currently in preparation In the current situation, government views the development of the third mission as a potential way to enhance and improve the financial profile of HEIs through interaction with industry, business and the international community. The senior management teams in the visited HEIs also shared this view. This bears a major risk for the diversity and sustainability of the higher education system. Without a clear definition and robust anchoring of third mission activities in both the national strategies and performance agreements with the HEIs, the third mission is likely to become reduced to revenue-generating activities and in the long-term a "shift of the university from being grounded within the fiduciary system to being institutionally linked with both the political and economic spheres" (Goldstein, 2010).

At the time of writing this report, all HEIs were reviewing their institutional development strategies up to the year 2020 with the Ministry of Human Capacities. This also includes a further embedding of third mission activities into education and research, and in the institutional performance contracts. Slightly more than half of the HEIs surveyed for this report currently offer entrepreneurship education activities and one-third provides start-up support. The majority of HEIs have agreements with government bodies

for the entrepreneurship education activities they offer (81%), and slightly less for the start-up support measures (70%). Entrepreneurship and innovation also occur as key words in the institutional strategies of the HEIs, however less often than knowledge exchange or internationalisation.[1]

Figure 2.1 shows the varying entrepreneurship related objectives of Hungarian HEIs as derived from the HEI Leader Survey implemented as part of this review. "Co-operation between HEI and local firms" was ranked highest by both universities and the other types of higher education institutions. All surveyed HEIs assigned medium to high importance to developing the entrepreneurial competences of students and to the promotion of self-employment and business start-up as a viable career option. Supporting start-up activities was perceived as more important by the universities than the other HEIs. Least relevant for universities was commercialisation of research results through technology transfer, whereas for the other HEIs it was supporting staff in their business start-up intentions. Overall the entrepreneurship related objectives were rated higher by the universities (4.1) than by the other HEIs (3.2).

Figure 2.1. **Entrepreneurship objectives of Hungarian higher education institutions**



Notes: Higher education institutions (HEIs) were asked: "How important are the following objectives for your HEI?". Respondents indicated the level of importance on a 5-point Likert scale from 1 = "Not important at all to 5 = "Very important". 5% trimmed means are shown. A total of 27 HEIs responded (15 universities, 4 universities of applied sciences and 8 colleges of education). Data is shown for universities and other types of HEIs, which include the universities of applied sciences and the colleges of education. The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), *HEI Leader Survey Hungary*.

Only five of the HEIs have specific performance targets and metrics in place for these strategic objectives. This number is likely to increase as half of the HEIs reported in the survey that discussions are ongoing in their governing boards to introduce performance measures for the entrepreneurship objectives. This will also help the HEIs to link their various strategic objectives with each other, for example, internationalisation and assuming a leading role in the local development agenda.

Introducing performance management of strategic objectives related to entrepreneurship is likely to require further changes to current regulations and procedures in Hungarian HEIs. This is an area of dynamic change as the example of Semmelweis University illustrates. A recent modification to the charter allows the university to undertake new revenue generation activities, such as industry advertisement and film production on campus. This brings new opportunities for industry collaboration, which, however, will need to be supported by an effective implementation plan that connects these activities with education, research and third mission activities. At system level a recent legislative change now allows HEIs to undertake for-profit activities (see Chapter 3).

Communicating the institutional development plan is crucial for effective implementation. Most of the surveyed HEIs (82.1%) reported to communicate the strategy on a regular basis to staff and students. Often, this requires specific efforts to "translate" a document, which may have been drafted mainly for administrative purposes and negotiations of performance agreements with the government, into a document that meets the interests and needs of various strategic stakeholders. Such a process is currently underway in the Eszterházy Károly University of Applied Sciences. The 1000-page institutional development strategy, which served the purpose of guiding the HEI's transformation into a university of applied sciences, is now being summarised into a much shorter document, which is tailored to the interests of key stakeholders and identifies niche areas of collaboration and intended impacts in terms of the economic, social, environmental and cultural outcomes of a transformed higher education provision in Eger. This is a good example of how to communicate across the HEI and beyond the HEI's strategy, its underlying vision, and the opportunities for new activities.

There is commitment at a high level to implementing the entrepreneurial agenda

For an effective implementation of the entrepreneurial agenda, a high level of commitment in implementing the strategy is needed, as well as a shared understanding of what the entrepreneurial agenda means for the different actors in the HEI (leadership, academic staff, administrative staff and students), and external partners (e.g. government, businesses, civil society organisations, donors, etc.).

A starting point is to widely share information about the institutional development strategy and to establish a common understanding of what the entrepreneurial agenda entails in terms of objectives, activities, priorities and resources. All HEIs reported in the survey to involve staff in the institutional strategy review and more than half also involve students (55.6%). Approximately one-third reported to involve local firms and their representative bodies; four HEIs involved local and regional governments.

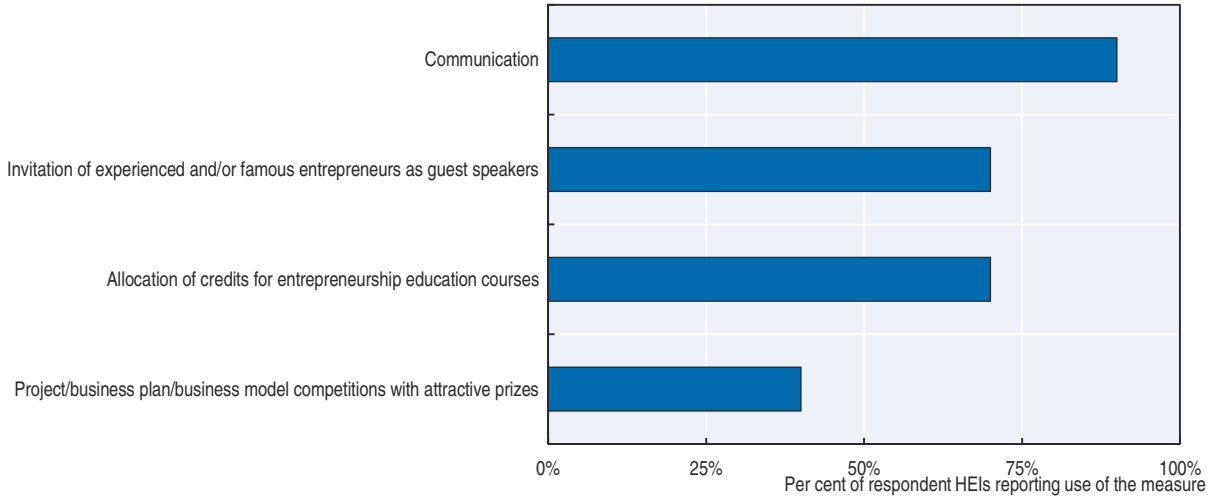
There is a strong focus in the entrepreneurial agenda of HEIs on commercialisation activities and other forms of knowledge exchange which may not have a revenue stream attached (e.g. community engagement activities). Nevertheless, there are plenty of initiatives – often promoted by very motivated individual staff members – that seek to broaden the entrepreneurial agenda. Innovation in teaching, in the form of pedagogies, learning outcome assessment and learning environments, is a crucial element of the entrepreneurial agenda. Technology is changing quickly and more important than knowledge acquisition is to develop the skills needed to apply knowledge in different and unknown contexts.

Activities that promote a positive attitude among students to consider starting up a business as a viable career option are also part of the entrepreneurial agenda. More than half

of the surveyed Hungarian HEIs currently offer entrepreneurship education activities and four HEIs are planning to introduce these activities, whereas one-third offer special support measures for nascent entrepreneurs. 75% of the surveyed HEIs reported to have established positions for entrepreneurship education, whereas only slightly more than 20% reported to have positions related to start-up support. Positions for entrepreneurship education activities were mostly hosted in faculties/departments, whereas start-up support was covered by non-academic staff. One HEI had created a senior-level management post in charge of the entrepreneurial agenda. Technology transfer offices play an important role in this, too. In some cases, the technology transfer office was set up as a separate legal entity.

According to the survey results, on average one-third of students currently participate in entrepreneurship education activities, and the HEIs expect to reach on average half of the student body within the next five years. A possible barrier might be that the information on these activities is not readily available. This was also confirmed by the study visits. 75% of the HEIs currently offering entrepreneurship education, reported to undertake targeted efforts to increase the participation rate. A range of targeted efforts are underway (Figure 2.2). Most common are communication efforts, followed by invitation of entrepreneurs as guest speakers and allocating credits in line with the European Credit Transfer and Accumulation System (ECTS). This is a very effective way of raising the interest of students. Least common was the organisation of business plan competitions with attractive prizes.

Figure 2.2. **Measures to enhance participation in entrepreneurship education**



Notes: Higher education institutions (HEIs) were asked: "What measures does your higher education institution (HEI) implement to increase participation rates in entrepreneurship education activities?". Total number of respondents was 16 HEIs (11 universities, 5 other HEIs). The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), *HEI Leader Survey Hungary*.

Most of the surveyed HEIs reported to publish information on entrepreneurship support activities on their institutional website, and on average it takes three "clicks" to get to this information. Social media, in particular Facebook, is also used either by students themselves, or by teaching staff to spread information about entrepreneurship.

Individual staff members play an important role in enhancing the entrepreneurial agenda of the Hungarian HEIs. These people are highly motivated to make a positive impact, and often this comes on top of their daily workload. Several examples were encountered during the

study visits to the five HEIs. The establishment of an institutional support framework is important to sustain these initiatives and leverage from them an HEI-wide impact. A possibility is to create the position of a vice-rector for the entrepreneurial agenda with the aim to nurture synergies between the different aspects of the entrepreneurial agenda, and to tie these further into the HEI's core functions in education and research. Such a position also facilitates collaboration with current and future partners on the entrepreneurial agenda.

A main barrier in the current system is the allocation of staff time, with two-thirds for teaching and one-third for research activities, which does not leave room for third mission activities. Even if third mission activities are embedded into teaching and research, it takes time and effort to establish the basis for relationships that contribute to teaching (e.g. field visits), research (e.g. field data), and result in knowledge application (e.g. new product or service). Allowing staff to use part of their time for relationship building, and the existence of horizontal services that support staff in their efforts and make sure that individual contacts can have a wider institutional impact are suggested areas of action for Hungarian HEIs (see Chapters 3 and 4).

There is a model in place for co-ordinating and integrating entrepreneurial activities across the HEI

A key challenge for the HEI leadership is to secure and co-ordinate the diversity of inputs into the entrepreneurial agenda from across the HEI. The current approach in Hungarian HEIs is based on very committed individual champions. As long as there are only a few activities, duplication and overlap may not be an issue, and perhaps may even be desirable to increase critical mass. Survey findings reveal that a range of different, mostly HEI-internal people are involved in the entrepreneurship courses. In order of the reported number of teaching staff currently involved in these activities, these are: lecturers, that is, temporary hired staff, followed by associate/assistant professors, external stakeholders, PhD students, full professors, and researchers. Most of the HEIs, who reported to currently offer entrepreneurship education activities involve guest speakers in less than one-quarter of the entrepreneurship course activities. Five of the surveyed universities reported to have a permanent contact point or office for entrepreneurship, and a further three were planning to establish one. The activities of this permanent contact point were mostly carried out by full-time employees, often with the support of students.

Different approaches have been tried out by HEIs across Europe to introduce an effective model for co-ordinating and integrating entrepreneurial activities across the HEI. A common model is that the entrepreneurial agenda is anchored within senior management, often in form of a dedicated unit, which is part of the rector's or the vice-rector's office, and tasked to oversee the entrepreneurial agenda. Another approach is to appoint one or more professors, who have entrepreneurship in their title, or a chair in entrepreneurship. Another, increasingly practiced approach is the establishment of an entrepreneurship centre, which promotes easy access and visibility inside and outside the organisation. An effective model for co-ordinating and integrating entrepreneurial activities across the HEI is also important for an exchange of experiences and peer-support, particularly in education activities. Whichever model is employed, it should take into account existing relationships, co-ordinate across departments, faculties and other units, and avoid the duplication of work both inside the higher education institution and within the surrounding entrepreneurial ecosystem.

HEIs in Hungary have opted mostly for the first or the last of these three approaches. Often the technology transfer office assumes a leading role in co-ordinating commercialisation and support for venture creation. Depending on the overall conceptual anchoring of the entrepreneurial agenda in the HEI, this may lead to a greater orientation towards commercialisation of research results and spin-offs. In the visited HEIs, a good start was made with the further development of technology transfer units into innovation centres with a broadened institutional and conceptual remit. It remains to be seen how industry partners will react to the proposed administrative integration of the innovation centres into the chancellor's office, as apparently discussed in some HEIs. Concerns are that this will result in a decrease of administrative flexibility and less autonomy in decision making.

The HEI encourages and supports faculties and units to act entrepreneurially

Generally, it can be assumed that HEIs with fewer barriers or hierarchies will find it easier to implement an entrepreneurial agenda because new units, centres, and support measures can be created more easily. In Hungary, faculties have a high level of autonomy. In some departments, this has created an environment where it is easy to implement change. The involvement of external stakeholders through formal communication channels, such as advisory boards, has also helped (see Chapters 3 and 4).

Some HEIs have established a non-profit organisation for faculties and units to act entrepreneurially. An example is Universitas a public foundation at Széchenyi István University. It started as a company located within the campus in Győr. The University originally held a 20% share, which was recently sold. The rector and the chancellor, as well as city and local industry and business representatives are members of the board of trustees. So far, Universitas has maintained close contacts with all faculties of Széchenyi István University and has supported principal investigators and other research team members in their funding applications. With the integration of two, geographically distant campuses, this will become more challenging. Nevertheless, Universitas has a good potential to raise awareness among researchers and faculty leaders on the relevance of interdisciplinary education and research activities on topics such as e-mobility, which are key strategic areas with increasing demand for skilled labour and innovations.

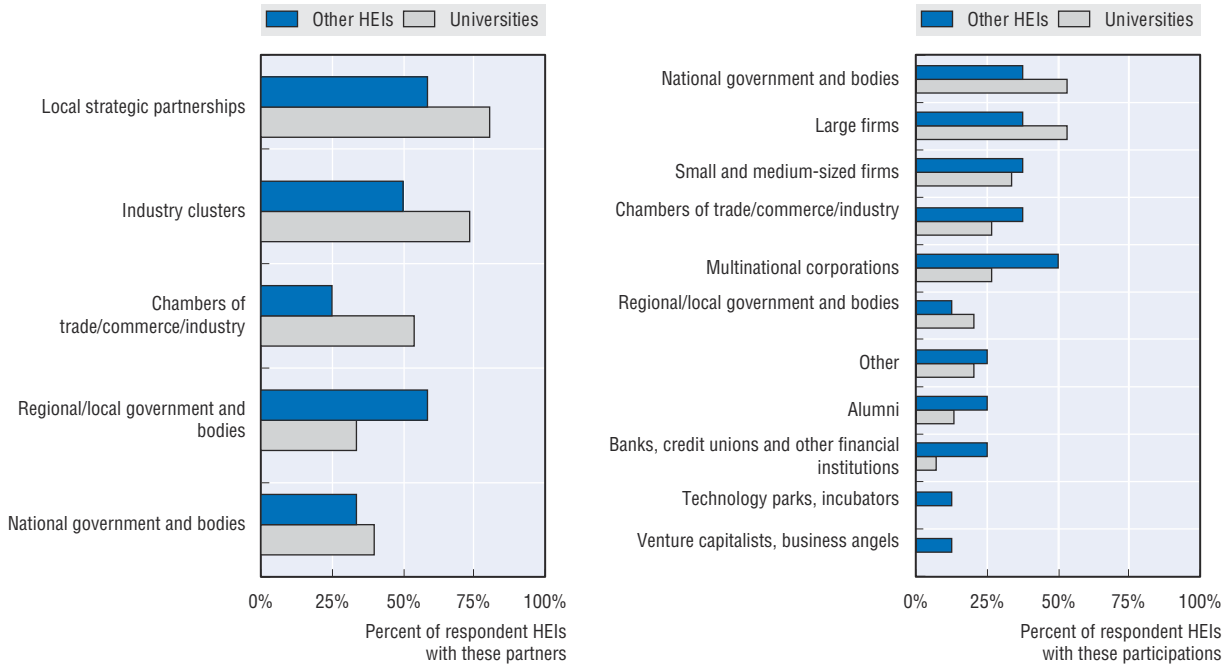
A good example of an initiative that encourages and supports staff and students to act entrepreneurially, and, at the same time, builds critical mass in new strategic areas is Demola Budapest, which was created as an open innovation laboratory within the Budapest University of Technology and Economics and is part of the international Demola Network. Since it started in 2012, multinational corporations, such as Vodafone, Siemens and Canon, and several small and medium-sized enterprises (SMEs) have collaborated with students on real challenges. Student teams work for four months under the supervision of academic and company staff on solutions for business challenges. Emerging business ideas can be purchased by companies within a few months of completion of the course offering a majority share of the price to the students. If the partner company does not want to purchase the final product the ownership falls on the students who invented/produced it.

The HEI is a driving force for entrepreneurship and innovation in regional, social and community development

HEIs in Hungary, particularly outside of Budapest, play several roles in their local environment and one of their key functions is to support and drive economic, social and cultural development. They are often one of the major employers in a locality and by their

existence will impact on the local economy and social wellbeing. The surveyed HEIs maintained close relationships with external stakeholders. Almost all universities and close to 60% of the other HEIs had representatives of external organisations participating in their governing or strategy boards. Most of the HEIs also participated in key organisational structures of their external stakeholders. High rates of involvement can be noted for local strategic partnerships, industry clusters and regional and local government bodies, whereas relationships with local Chambers were less frequent (Figure 2.3).

Figure 2.3. **Strategic partners of Hungarian higher education institutions**



Notes: The chart on the left shows the involvement of external stakeholders in the governing bodies of Hungarian higher education institutions (HEIs). Respondents were asked "Which of the following organisations or individuals are members of the governing board of your HEI?". The total number of respondents was 21 (14 universities, 7 other HEIs). The chart on the right shows the involvement of HEIs in governing boards or strategic positions of external stakeholders. Respondents were asked "Does your HEI participate in the governing boards of the following organisations and strategic initiatives to define the development directions of the surrounding local economy?". Data is shown for universities and other types of HEIs, which include the universities of applied sciences and the colleges of education. The total number of respondents was 28 (15 universities and 13 other HEIs). The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), *HEI Leader Survey Hungary*.

Relationship building is an institutional priority and most HEIs reported to have several means to formally recognise external stakeholders for their strategic contributions to the HEI's development. These are, in order of current frequency: award of honorary doctorates, professorships, and annual award ceremonies (82.6%), preferential partnerships for student or graduate recruitment (60.9%), naming of prestigious campus facilities (52.2%), and the use of facilities at free or reduced rents (43.5%).

Several examples of a prominent local development role were observed during the study visits to the five HEIs. The University of Debrecen can be considered a pioneer in the establishment and operation of industrial clusters related to its research areas. During the last decade, the University has been involved in five clusters including the pharmaceutical industry, thermal tourism, food industry, sports, informatics, and instrument development; two of these clusters are internationally accredited. The university has acted

timely upon public funding opportunities, which subsidised the creation of these clusters. Currently, contacts between the cluster firms and the university are organised at the rector's level involving key faculties through research collaboration and work placements of students through a cluster management company.

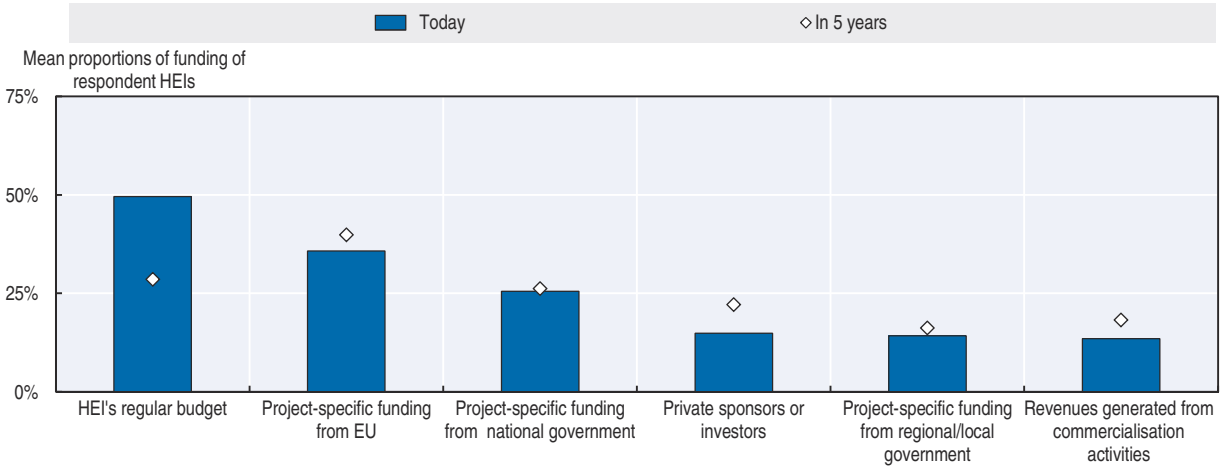
The Eszterházy Károly University of Applied Sciences is another good practice example of how scientific research results can contribute to diversification and quality premiums in local industry. The collaboration with the wine industry in the Tokaj cultivation area brings together a growing number of small-scale farmers, winery owners and the tourism industry with the aim to promote premium quality wines and local tourism. The university had a major role in the drafting of the Eger Regional Development Plan 2020.

Organisational capacity, people and incentives

Entrepreneurial objectives are supported by a wide range of sustainable funding and investment sources

Funding for the entrepreneurial objectives to date has been largely reliant on the HEI's regular budget and EU project-specific funding. Expectations for future funding sources are highest for private sponsors and lowest for institutional funding (Figure 2.4). While a small number of these activities appear to generate their own revenue streams, there is a need for continuous investment from the HEIs so that the infrastructure and activities created, such as technology transfer centres, innovation centres and entrepreneurship programmes, can fulfil their mandates, meet the needs of researchers and students and, meet institutional expectations.

Figure 2.4. **Financing entrepreneurship support in Hungarian higher education institutions**



Notes: Higher education institutions (HEIs) that currently offer entrepreneurship support were asked "What is the approximate ratio of the different funding sources your HEI uses to finance the entrepreneurship support activities?", and "Looking ahead for five years what ratio do you expect to come from the following sources for financing these activities?". A total of 17 HEIs responded (12 universities, 5 other HEIs). The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), *HEI Leader Survey Hungary*.

Generally speaking, a good starting point in broadening the range of sustainable funding and investment sources for the entrepreneurial agenda is the identification of areas and activities that external funding and sponsorship could support. There are some key challenges that HEI leadership needs to be aware of. Project-based funding does not provide a stable and long-term funding frame, not least because of its limited time frame

and the need to regularly apply for new funding. Some of the sources may not generate substantial and steady funding. For example, funding from alumni or wealthy individuals is often directed into specific activities (e.g. chairs, centres, education activities). Consultancy activities may have to be initially offered for free in order to attract customers. Revenues from academic spin-offs may neither be a steady income stream nor generate much income. HEIs will also need to demonstrate to private and local public funders the value of their entrepreneurial activities, e.g. for local and regional development, in order to create long-term commitment of funding sources. It is thus important to:

- Map the variety of funding sources already used by the different faculties to avoid approaching the same funding source several times, but also to facilitate communication with funders.
- Establish control mechanisms, which ensure that the entrepreneurial agenda does not become overly dependent on funders who may simply be interested in pushing their own priorities.
- Invest in training for staff involved in fundraising.

Hungarian HEIs need to increase their current efforts in all these three areas. Most of the surveyed HEIs reported to be active in fundraising. It is mainly the responsibility of top-level management; in less than half of the HEIs this was delegated to academic staff, and only two HEIs offer training for staff involved in fundraising.

The HEI has the capacity and culture to build new relationships and synergies across the institution

All staff and students are central stakeholders of the entrepreneurial agenda and ideally work together to create dialogue and linkages across the organisation and beyond its borders. However, traditional boundaries and silos between administration and faculties, faculties and students and management and non-management can make this challenging and resource intensive. Breaking down boundaries and developing integration is a long-term endeavour, which starts with awareness creation, and is nurtured with incentives and rewards.

Connecting staff is an important step towards changing attitudes and building an entrepreneurial culture across the HEI. A starting point could be the introduction of regular exchange and consultation meetings, involving all staff within faculties/departments, administration and senior management. The overall objective of a continued cross-staff exchange and consultation process is to create an environment which enhances exchange and collaboration, identifies and addresses (disciplinary) barriers, promotes awareness of what an entrepreneurial organisation entails, and, in the long run, leads to the emergence of an entrepreneurial culture in the organisation. Such meetings allow staff to keep up-to-date with current developments and to get to know each other personally. These meetings can also help staff coping with reservations and challenges related to their specific areas and tasks.

In Hungary, the recent change in the allocation of competitive research funding to transdisciplinary research projects can be an important lever in promoting such synergies. From the study visit to the five HEIs it appears that building relationships and synergies across the institution is an area of untapped opportunities. Although there are examples of inter-faculty and interdisciplinary communication, there is a lack of detailed knowledge about what is happening at the overall level in the HEI or in other faculties. A good starting point is the availability of shared facilities across faculties (e.g. innovation centres), as is present in some of the visited HEIs (see Chapter 4).

Another possible area of supportive intervention in establishing cross-faculty synergies are interdisciplinary education activities. Approximately 70% of the surveyed HEIs reported to offer interdisciplinary study programmes at Bachelor and Master levels, less frequent are those for doctorate programmes (51.9%). Further, 85% reported that they offer interdisciplinary education activities, which are open to students from all faculties. Students cannot always earn credits for these activities; only 40% of the interdisciplinary education activities offered at Bachelor level and 48% of the activities at Master level offer credits as per the European Credit Transfer and Accumulation System (ECTS).

The HEI is open to engaging and recruiting individuals with entrepreneurial attitudes, behaviour and experience

Less than half of the HEIs indicated in the HEI Leader Survey that private sector experience is considered in the recruitment of academic and research staff; no difference was noted between universities and other HEIs. A major systemic barrier in Hungarian HEIs is that wage levels in academia are much lower than in the private sector.

Different approaches are being adopted to integrate experiences from the outside world into the education programmes, mostly with regard to invited speakers or business oriented people that get involved in teaching activities. All except for two HEIs reported in the HEI Leader Survey to involve external stakeholders in teaching activities. Almost 60% of the surveyed HEIs reported to have formal evaluation procedures in place for this. The recent introduction of dual education programmes (see Chapter 1) will have likely increased private sector participation in higher education.

The HEI invests in staff development to support its entrepreneurial agenda

Continuous professional development for staff is not widely practiced in Hungarian HEIs. Less than one-third of the surveyed universities and two-thirds of the other HEIs reported to have a formal policy for training and career development in place for all staff. Competency frameworks are most common for professors, and least common for administrative/non-academic staff. A possible explanation is the existence of different job profiles falling under this category. Training was in place for all professors and the majority of administrative staff, but only one-third of lecturers, that is, temporarily hired teaching staff, had access to training.

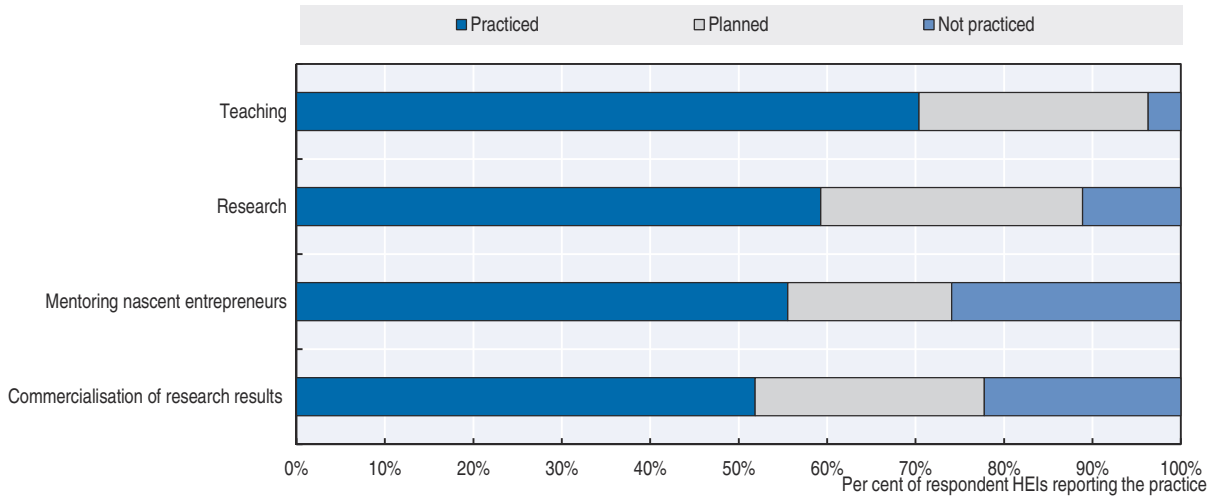
Training for staff involved in entrepreneurship support is largely underdeveloped. Only three HEIs reported to offer further education and training possibilities for staff involved in entrepreneurship education, and only one HEI was offering this for staff members working in the area of venture creation. A promising practice in this field is the recently started initiative by the education department of the Eszterházy Károly University of Applied Sciences to organise training in experiential pedagogies for educators in higher education.

The presence of key professional staff members in entrepreneurship is still quite recent in Hungarian HEIs and often confined to business schools, economics departments and technology transfer offices. Non-academic positions often have short-term contracts and are thus dependent upon the timing of project-funding. Highly qualified professionals, fully dedicated to innovation and entrepreneurship activities should have well-defined and stable careers within the HEI, to further motivate their dedication to these still recent fields of intervention.

Incentives and rewards are given to staff who actively support the entrepreneurial agenda

Academic staff members are primarily recruited, evaluated and promoted on the basis of their research performance and teaching track record, rather than contributions made to the HEI's entrepreneurial agenda and achievements in third mission activities. Survey findings confirm this. Incentives and rewards for excellent performance in teaching and research are more common than for involvement in commercialisation activities or mentoring nascent entrepreneurs, but the latter are growing (Figure 2.5). Incentives for commercialisation operate at the level of faculties/departments. Only one-third of the HEIs reported to have an incentive system for a broader set of knowledge exchange activities; these incentives were mostly directed to individual staff members.

Figure 2.5. **Staff rewards in Hungarian higher education institutions**



Notes: Higher education institutions (HEIs) were asked: "Are there formalised processes to identify and reward excellent performance in teaching?", "Are there formalised processes to identify and reward excellent performance in research?", "Does your HEI have an incentive system for staff, who actively support the commercialisation of research for example by making research results available, acting as mentors, etc.?". Data is shown for universities and other types of HEIs, which include the universities of applied sciences and the colleges of education. A total of 28 HEIs responded (15 universities and 13 other HEIs). The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), *HEI Leader Survey Hungary*.

One of the challenges faced in Hungary is that the career progression of academic staff depends heavily upon teaching and research outputs, which discourages involvement in the entrepreneurial agenda since this takes away time from teaching and research. A good starting point for the introduction of incentives and rewards for an active contribution to the entrepreneurial agenda is to document teaching, research and third mission activities. The Eszterházy Károly University of Applied Sciences has recently introduced such a system, called OKMR. It records quality assessment results of teaching activities from regular student evaluation, and the aim is to pilot evaluations using prior and post intervention tests to assess teaching styles. It is also planned to document and assess relationship building across faculties (read more on this in Chapter 3).

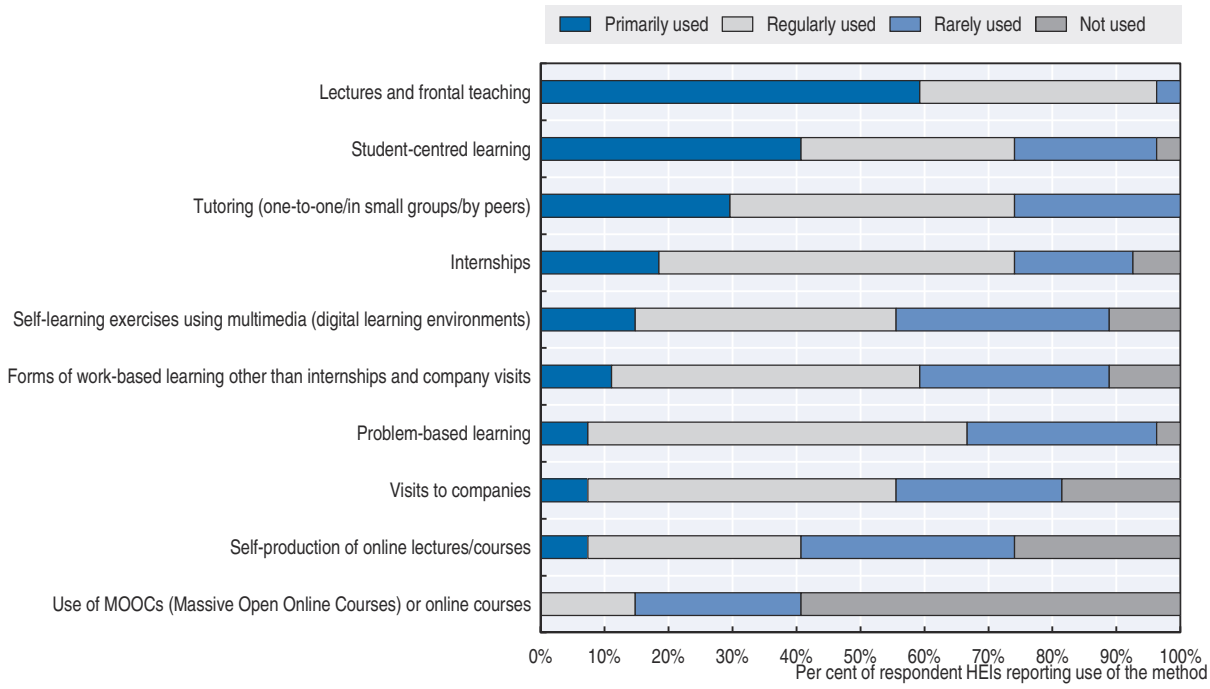
Entrepreneurial teaching and learning

The HEI provides diverse formal learning opportunities to develop entrepreneurial mindsets and skills

Approaches to teaching in higher education are broadening in Hungarian HEIs. Key drivers for this have been the gradual inclusion of entrepreneurship as a key transversal

competence as a learning outcome in higher education, and the introduction of several opportunities for soft skills development both within and outside the formal curriculum. The overall approach to teaching in higher education is, however, still quite traditional, often relying on lecture style teaching. All HEIs that responded to the Leader Survey indicated that lectures are a commonly used teaching method while experiential forms of learning, such as problem solving and work-based learning, are used much less frequently (Figure 2.6). This implies that teaching is oriented more towards transferring knowledge rather than transferable skills that also allow the application of knowledge in unknown contexts; or, as one of the students interviewed during the study visits pointed out "in Hungary it is quite accepted that you learn the job on the job and not in university".

Figure 2.6. **Teaching methods in Hungarian higher education institutions**



Notes: Higher education institutions (HEIs) were asked: "To what extent are the following teaching methods used at your HEI?". Response options were "not used", "rarely used", "regularly used", "primarily used". Data is shown for universities and other types of HEIs, which include the universities of applied sciences and the colleges of education. A total of 28 HEIs responded (15 universities and 13 other HEIs). The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), HEI Leader Survey Hungary.

There are examples of interdisciplinary study programmes that involve different HEIs. One of these is organised by ELTE University and Semmelweis University for Master students in pharmaceutical studies. Students are trained at the two universities. An interesting development has started with the introduction of dual education programmes (Chapter 1). As the example of the Faculty of Food Sciences at Szent István University in Gödöllő shows, these new programmes at Bachelor level have contributed to new opportunities for interdisciplinary collaboration, technical research and product development at Master and PhD levels.

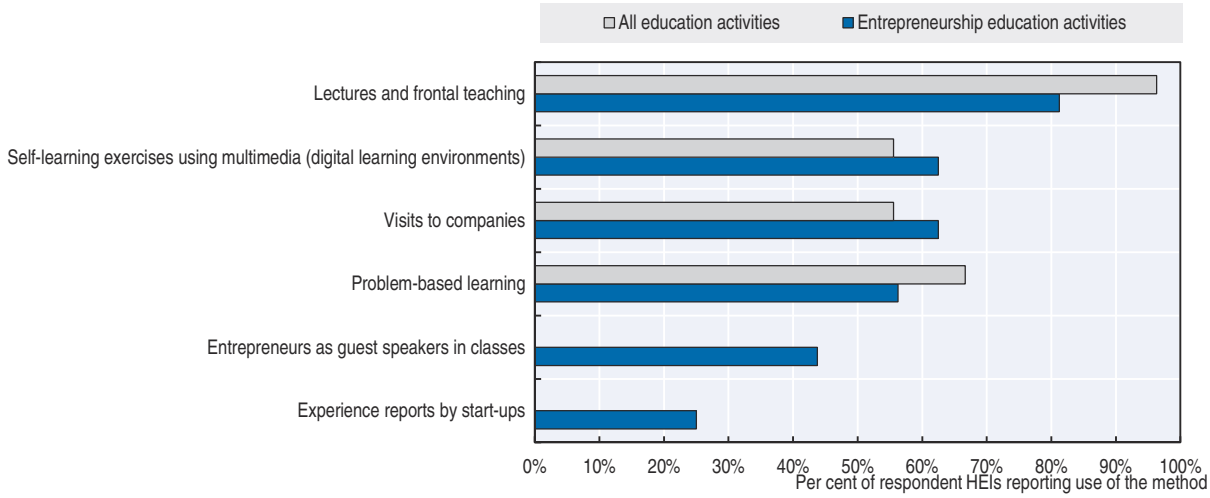
The interviews during the study visits to the five HEIs suggest that there is more room to make courses and study programmes interdisciplinary, so that students get better exposure to different ways of thinking. A starting point for this could be the Talent

Programmes, which exist at all HEIs. Professors suggest students for inclusion on the programmes based on their academic achievements. Students in the Talent Programmes get support in academic writing and research methodology, conference participation and in publishing papers. The latter are counted as credits and can be converted into a scholarship or additional monetary support; also, most doctoral schools will consider programme participation and credits in their application procedures.

Looking more specifically into entrepreneurship education, 15 HEIs (11 universities and 4 other HEIs) reported to currently offer activities that develop entrepreneurship as a transversal competence, which is relevant for all walks of life, and/or lead to a particular set of skills that are needed to start up and grow a business. A further two HEIs reported to discuss in their governing boards the introduction of such education activities. More HEIs offered these activities as part of the study curriculum (86.7%), rather than as an extra-curricular offer (68.8%); and they were mostly targeted at all students instead of specific activities for students in programmes with a focus on business, marketing and economics.

Looking more specifically into entrepreneurship education, lectures and frontal teaching are one of the most common teaching methods. Comparing the teaching approaches in entrepreneurship education activities with those of all education activities, not much difference can be noted for frontal teaching. Visits to companies and digital learning environments seem to be more practiced in entrepreneurship education than in the other education activities, whereas problem-based learning is more common in the latter. Inviting entrepreneurs as guest speakers in classes is regularly organised in less than half of the HEIs. Experience reports by start-ups are regular practice in only half of the entrepreneurship education activities (Figure 2.7).

Figure 2.7. **Teaching methods in entrepreneurship courses in Hungarian higher education institutions**



Notes: Higher education institutions (HEIs) were asked: "To what extent are the following teaching methods used at your HEI?". Response options for both questions were "not used", "rarely used", "regularly used", "primarily used". Accumulated responses for "regularly used" and "primarily used" are shown. HEIs that reported to currently offer entrepreneurship education activities were asked "To what extent are the following teaching methods used in the entrepreneurship education activities currently offered at your HEI?". The total number of responses analysed for this question was 15 (11 universities, 4 other HEIs). Response options for both questions were "not used", "rarely used", "regularly used", "primarily used". Accumulated responses for "regularly used" and "primarily used" are shown. The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), HEI Leader Survey Hungary.

The HEI provides diverse informal learning opportunities and experiences to stimulate the development of entrepreneurial mindsets and skills

Extracurricular learning opportunities have become an important complement to formal entrepreneurship courses. The Team Academy in Debrecen is a commendable example. It started at the University of Debrecen's Faculty of Applied Economics and Rural Development in 2010. Students of BSc Programmes in finance and accounting, commerce and marketing, and tourism and catering participated in this training from their fifth semester onwards. The core idea of the training is based on the principle of "learning by doing"; the students create a limited liability company, like in Finland[2], and work in small groups on several projects. Each team organises its activities as a real-life team company that is owned entirely by the so-called "teampreneurs" (Ványi et al., 2016).

Another example is the "Manager Passport" programme at the Széchenyi István University. It is a small-scale programme to stimulate the development of entrepreneurial mindsets and skills, which can host 15 to 18 students on a 40 hour training course with two teachers, who act as programme leaders. One of them is a psychologist, who has a visiting professor appointment at the University. Currently, the programme is open only to final-year students, who can apply for admission with their CV, a motivation letter and a reference from one of their academic teachers. Most applications come from students in economics and engineering programmes. After successful completion of the training course students get a "passport" and a diploma supplement. Former students have created an alumni association which meets frequently and brings current and former course participants together.

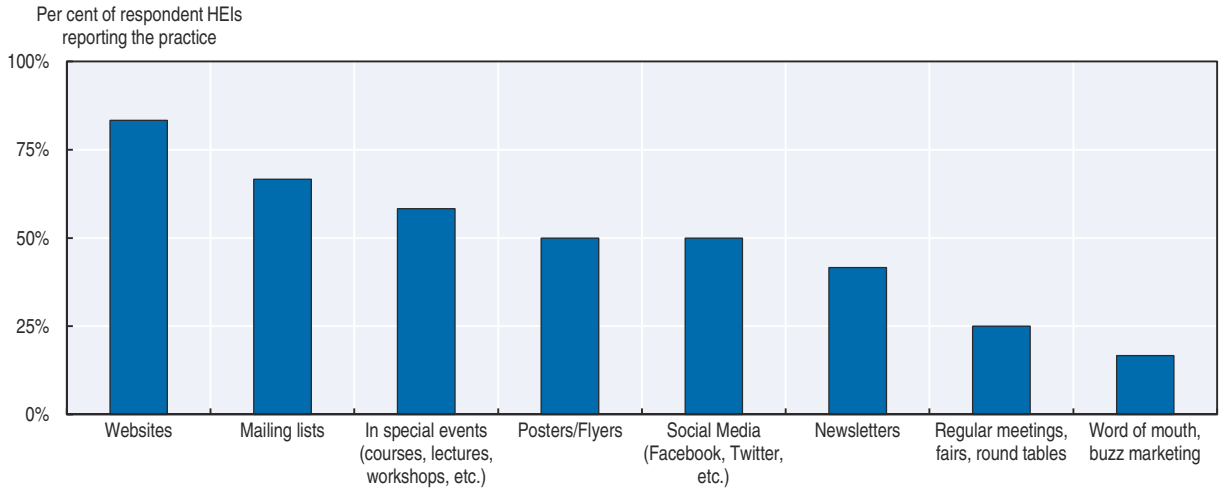
The HEI Leader Survey shows that student demand for informal learning opportunities has increased in more than half of the surveyed HEIs, who currently offer entrepreneurship education activities. Common means to advertise extra-curricular education activities on entrepreneurship are websites, mailing lists and announcements in dedicated events (Figure 2.8). Half of the HEIs disseminate information through social networks, such as Facebook and Twitter, and more than one-third produces newsletters.

The HEI validates entrepreneurial learning outcomes which drives the design and execution of the entrepreneurial curriculum

Formal evaluation of entrepreneurship education activities is not yet widely practiced. Slightly more than half of the surveyed HEIs who reported to offer entrepreneurship education activities, also undertake formal evaluations of these activities. When practiced, this is mostly an obligatory procedure. The focus is on competence development and satisfaction of participants; none of the HEIs were measuring the motivation to start-up a business. Two-thirds were using a standard questionnaire instead of a specifically tailored survey instrument; one HEI reported that entrepreneurship education activities were also evaluated with the help of a focus group. In the case where a questionnaire was used it was mostly at the end of the course (87.5%) and in only two HEIs was a questionnaire completed at multiple time points (Figure 2.8, below).

Hungarian HEIs also participate in the Global University Entrepreneurial Spirit Students' Survey (GUESSS). The latest report, from 2011, was prepared by the Budapest Business School and the University of Miskolc. Between 30-40% of surveyed students across all Hungarian HEIs indicated to consider starting a business or taking over an existing venture as viable career option. There are also examples of HEI-specific surveys of the entrepreneurial intentions of students. An example is the Szent István University campus in Gödöllő, which has undertaken recently a survey of its student body. Results show a high interest in

Figure 2.8. **Advertising extra-curricular entrepreneurship activities in Hungarian higher education institutions**



Notes: Higher education institutions (HEIs) that currently offer entrepreneurship education activities were asked: "How do you advertise the entrepreneurship education activities that are organised outside study curricula/programmes or open across faculties?". A total of 15 higher education institutions (11 universities, 4 other HEIs) responded to the question. The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), HEI Leader Survey Hungary.

entrepreneurship. This has been taken into consideration by senior management for an eventual replication of the survey on a larger scale to inform an increase of the entrepreneurship support activities in the various campus locations.

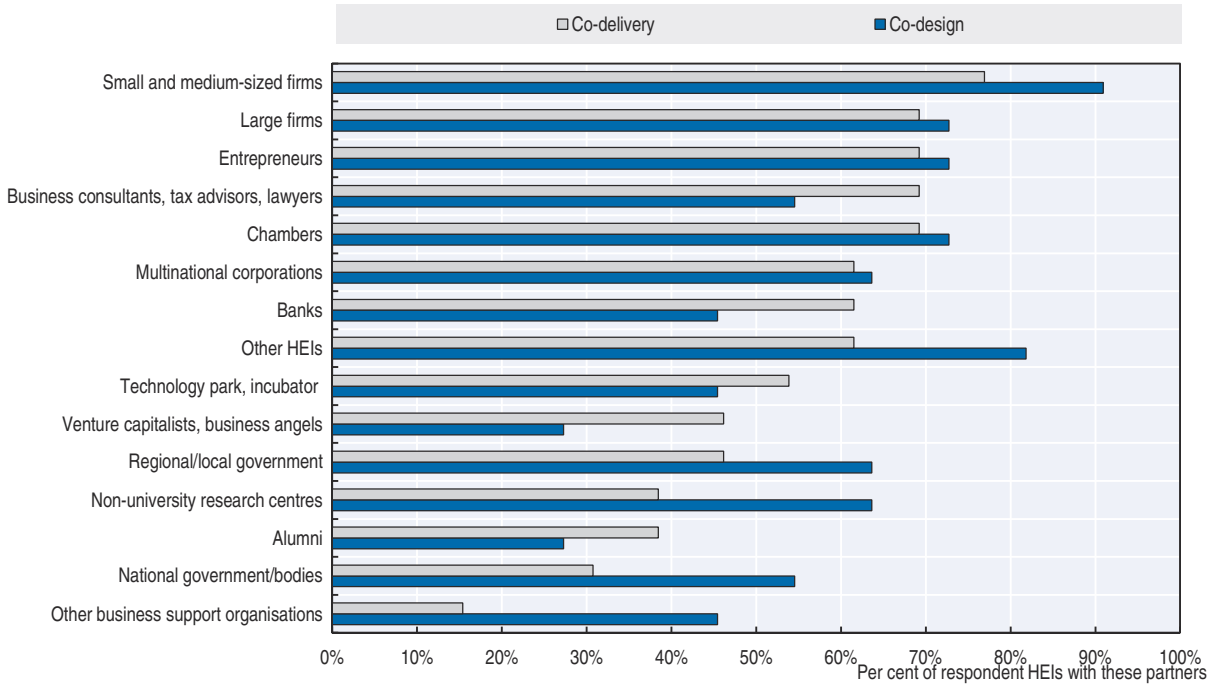
The HEI co-designs and delivers the curriculum with external stakeholders

External stakeholders are an important source of expertise in entrepreneurial teaching and learning in Hungary. The surveyed HEIs reported the involvement of a broad variety of external stakeholders in the design and delivery of entrepreneurship education activities. It appears that more HEIs collaborate in the actual delivery of entrepreneurship education activities than in the design phase (81.3% versus 68.8%). Most frequent collaboration partners in the design of these activities are SMEs, Chambers, business consultants and lawyers, and large firms. More than half of the HEIs collaborate with technology parks, banks, multinational corporations and other HEIs. SMEs are also the most common partners in the delivery of entrepreneurship education activities, followed by other HEIs. Connections with the financial sector (e.g. banks, venture capitalists and business angels) could be strengthened for the design of education activities (Figure 2.9, below).

Results of entrepreneurship research are integrated into the entrepreneurial education offer

Results of entrepreneurship research are included in entrepreneurship teaching. The HEI Leader Survey indicates that approximately 80% of HEIs use research results in their teaching. The challenge for entrepreneurship professors in Hungary, like in the other central and south eastern European countries participating in the HEInnovate country reviews, is that entrepreneurship is not seen as an academic discipline that is on par with traditional disciplines, such as business administration or organisational sciences. Consequently, entrepreneurship professors do not tend to conduct research in entrepreneurship. One way

Figure 2.9. **Partners of Hungarian higher education institutions for entrepreneurship education**



Notes: Higher education institutions (HEIs) that currently offer entrepreneurship education activities were asked: "With which of the following organisations or individuals does your HEI collaborate regularly in the conceptual development of the entrepreneurship education activities?", "With which of the following organisations or individuals does your HEI maintain regular collaboration in the delivery of the entrepreneurship education activities?". A total of 16 HEIs (11 universities, 5 other HEIs) responded to these questions. The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016) HEI Leader Survey Hungary.

to strengthen entrepreneurship education is to improve support for Hungarian researchers who wish to specialise in entrepreneurship, for example by facilitating their participation in international entrepreneurship education networks and attendance at international entrepreneurship conferences.

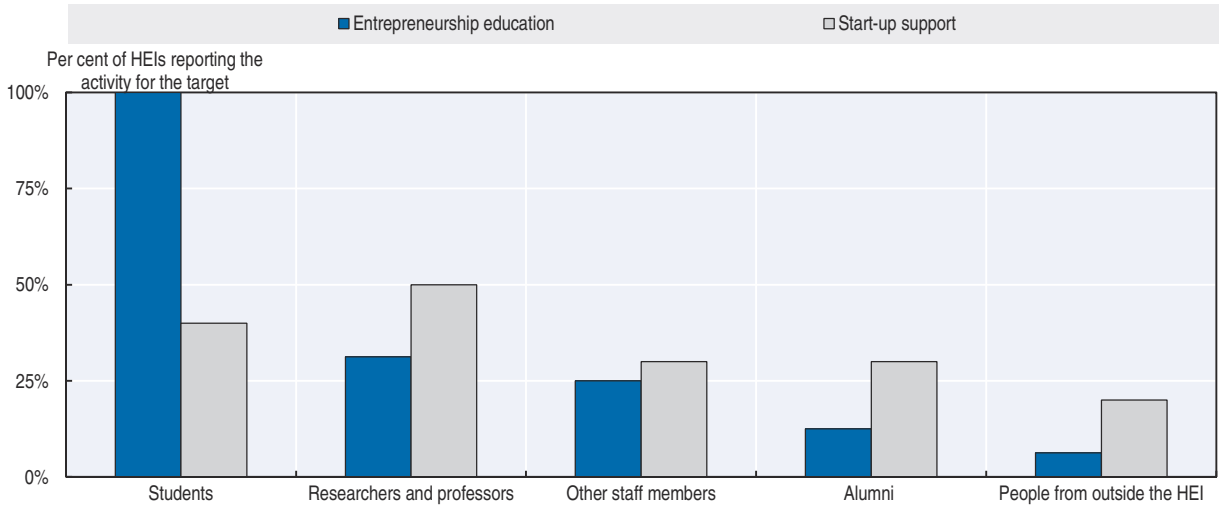
Preparing entrepreneurs

The HEI increases awareness of the value of entrepreneurship and stimulates the entrepreneurial intentions of students, graduates and staff to start up a business or venture

It is a good start that entrepreneurship education activities appear to be growing in Hungarian HEIs. This needs to be gradually matched with activities for students and staff who consider starting a new venture and want to take the next step. Most of the HEIs (76.9%) have adopted or are in the process of adopting rules and regulations concerning the commercialisation of scientific research; half were considering the use of trademarks. One-third of the HEIs were either holding shares in companies or discussing such practice in their governing boards. Channelling new ideas from researchers into new ventures can be difficult, not least because of the process of validating these ideas for support from the HEI's technology transfer office. In the current system, the rector plays a central role in deciding which idea is taken further for commercialisation. This, as well as the use of project idea questionnaires instead of scouting for ideas involving researchers and students, might narrow the range of projects and discourage people from getting involved.

In the case of students, there appears to be a gap between the provision of educational activities and support measures for nascent entrepreneurs, which are offered in less than one-third of the surveyed HEIs (Figure 2.10). Researchers, alumni, other staff, and externals seem to have less access to entrepreneurship education activities than to start-up support. This might be a missed opportunity as such activities, in particular if organised in highly creative contexts, often provide a fertile ground for idea generation and team building.

Figure 2.10. **Target groups for entrepreneurship support in Hungarian higher education institutions**



Notes: Higher education institutions (HEIs) that currently offer entrepreneurship education activities were asked: "Which of the following are target groups for the entrepreneurship education activities?" A total of 16 higher education institutions (11 universities, 5 other HEIs) responded to the question. HEIs that currently offer start-up support were asked "Which of the following are target groups for the start-up support measures offered at your HEI?". A total of 9 HEIs (8 universities and 1 other HEI) responded to this question. The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), HEI Leader Survey Hungary.

An example of an initiative that seeks to create such a highly creative context for idea generation and team building is Innovative Generation Debrecen (*Innovatív Generáció, !gen*), a three-month training and mentoring programme for "start-uppers". Each week has a dedicated topic with common workshops and individual mentoring sessions. The final is a competition with a jury composed of investors, the technology transfer office of Debrecen University and senior leadership. Participants pay a fee which varies depending on whether the aim is to develop a business idea or to join a team.

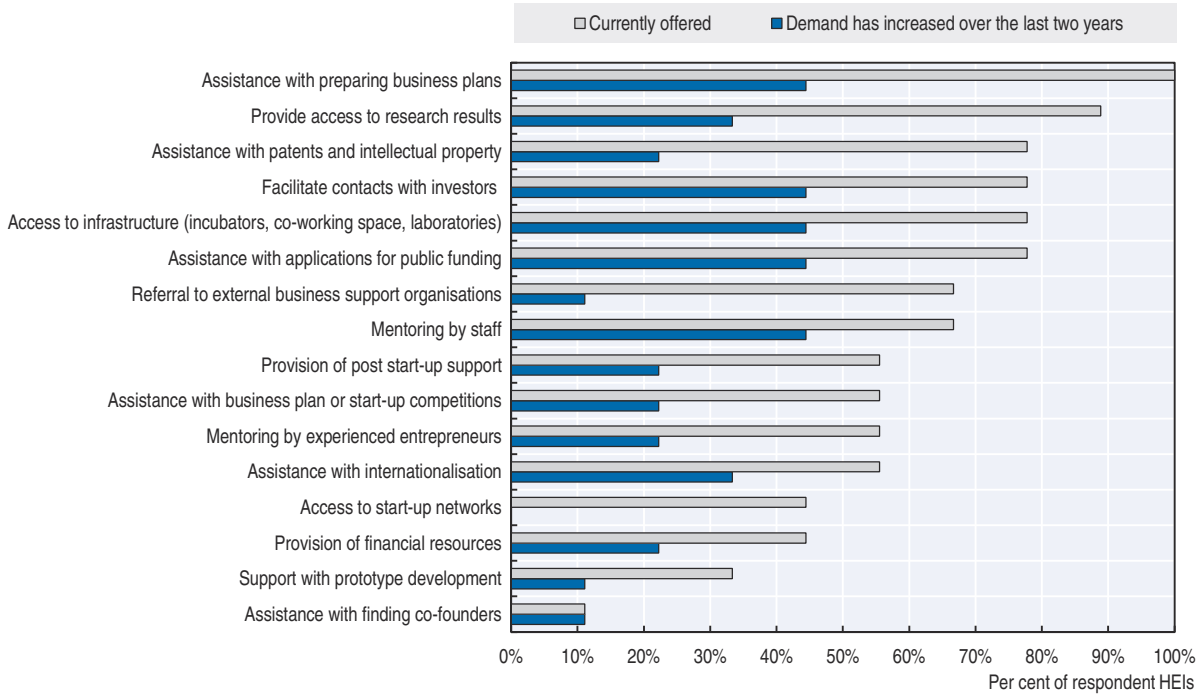
The HEI supports its students, graduates and staff to move from idea generation to business creation

Having an idea is only one – and not always the first – step on the start-up journey. In order to take an idea further, HEIs can provide aspiring entrepreneurs with a range of support services. It is not necessary for an HEI to offer all supports. It can be more efficient to develop partnerships with professional business support organisations and direct students to specialised services. For students, starting up a business during their studies can be highly burdensome. Study syllabi are packed full and it is not easy to argue for additional time to complete a semester assignment because work on the start-up took priority. This will have to be taken into consideration if the overall aim is to support students to move from idea generation to business creation while they are studying. Flexible exits and re-entries should

be created for students to accomplish multiple goals. This would also apply for students who take up a job offer prior to completing their studies – a common issue within some faculties, for example, computer engineering studies.

Researchers and scientists are also likely to be confronted with a difficult choice when they have to decide whether to progress in their research or to act upon an opportunity to commercialise research results. Access to top-quality and timely support, and the possibility to collaborate with students who may be more eager to take the business idea further, can make the decision easier and eventually render both options possible. In the HEI Leader Survey, one-third of the surveyed HEIs reported to offer special support for nascent entrepreneurs, with a wide portfolio of measures (Figure 2.11). All offer assistance with the preparation of business plans. This is followed by providing access to research results, for example by matching a team of students who want to start-up a business with a researcher who would like to commercialise his/her research results. Also commonly practiced are assistance with the handling of intellectual property rights and applications for public funding. Less common are support with prototype development and assistance in finding co-founders.

Figure 2.11. **Offer and demand for start-up support measures**



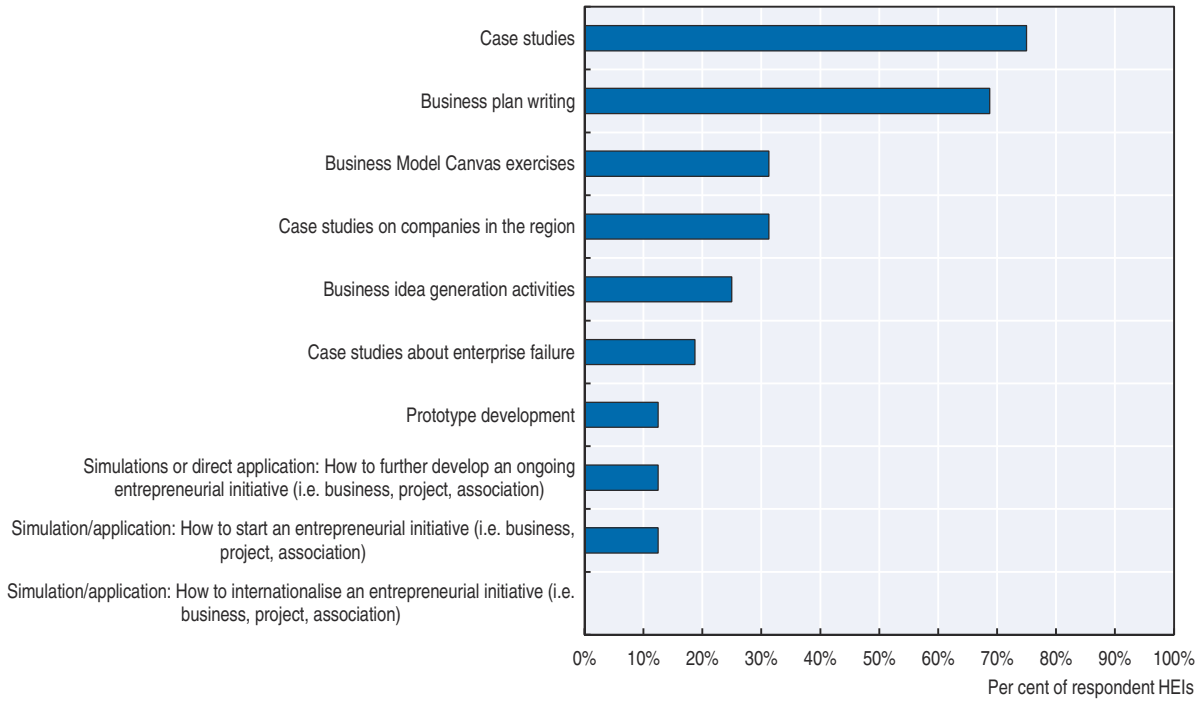
Notes: Higher education institutions (HEIs) that currently offer start-up support were asked: "You've stated earlier that your HEI currently offers special support measures for individuals or teams, who are interested in starting-up a business. What special support measures are currently offered?", "How has the demand for the special support measures developed over the last two years?". A total of 9 HEIs (8 universities and 1 other HEI) responded to this question. The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), HEI Leader Survey Hungary.

Except for help with accessing start-up networks, all support services have noted an increase in demand over the last two years. Highest increases were noted for assistance with the preparation of business plans, applications for public funding, access to infrastructure, mentoring by staff, and facilitation of contacts with potential investors.

Training is offered to assist students, graduates and staff in starting, running and growing a business

Start-up training courses, offered as part of the entrepreneurship education activities, can provide relevant knowledge about financing, legal and regulatory issues, and human resource management. Results from the HEI Leader Survey suggest that the entrepreneurship education activities tend to have a focus on business plan writing and case studies, whereas more practical aspects, such as prototype development and simulations of business start-up and early venture development are not regularly covered; how to internationalise an entrepreneurial initiative is not covered at all in the training (Figure 2.12).

Figure 2.12. **Training for venture creation in Hungarian higher education institutions**



Notes: Higher education institutions (HEIs) that currently offer entrepreneurship education activities were asked: "To what extent are the following teaching methods currently used in the entrepreneurship education activities at your HEI?" A total of 9 HEIs (8 universities and 1 other HEI) responded to this question. Accumulated responses for "regularly used" and "primarily used" are shown. The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), HEI Leader Survey Hungary.

Involving entrepreneurs, start-ups, venture capitalists and bankers more systematically in the start-up training will improve quality and relevance as students can gain insights and knowledge on what works and why, and what are common challenges and pitfalls. A promising initiative here is the recently started collaboration between Semmelweis University and Health section of the European Institute of Technology (EIT), which gathers several key industry players. The aim is to further embed business creation and development services, as well as broader innovation projects, in the current education and research activities.

Mentoring and other forms of personal development are offered by experienced individuals from academia or industry

Two-thirds of the HEIs that currently provide start-up support offer mentoring by staff, and slightly less offer mentoring by experienced entrepreneurs (Figure 2.11, above). Demand for mentoring has increased over the last two years; apparently more for staff acting as mentors than for experienced entrepreneurs (40%). Nine HEIs (four universities and five other HEIs) reported that acting as mentors for nascent entrepreneurs is part of their key performance indicators; four offer, in addition, a reduction of teaching hours for teaching staff acting as mentors and two offer an increase in salary.

The HEI facilitates access to financing for its entrepreneurs

The HEIs reported to offer a range of measures to facilitate access to finance (Figure 2.11, above). In order of frequency of current practice these are: assistance with applications for public funding (78%), facilitation of contacts with investors, such as banks, venture capitalists and business angels (78%), and provision of financial resources (44%). For all of these support services demand has increased over the last two years.

The HEI offers or facilitates access to business incubation

So far, only a few Hungarian HEIs offer incubation services. Two HEIs reported in the HEI Leader Survey to have already established an incubator and in five HEIs discussions on this were underway in the governing board. Business incubation on campus or in close proximity has been so far largely focused on spin-off activities, that is, on the commercialisation of research results through venture creation. The existing incubators were offering temporal rental either for free or at lower than market rates, access to the HEI's laboratories and research facilities, and IT services. One incubator also accepts non-HEI tenants. Coaching and training, help with internationalisation, and access to financing were not offered. Several policy initiatives are underway to increase the offer of business incubation services (see Chapter 1).

Knowledge exchange

The HEI is committed to collaboration and knowledge exchange with industry, the public sector and society

Hungarian HEIs take a very committed approach to working with the business sector, governments and community organisations. Current activities are likely to increase in the near future as a consequence of a grant scheme recently introduced by the National Innovation Development Office to align the research portfolio of HEIs to regional focus areas.

Results from the HEI Leader Survey indicate that the HEIs undertake a range of knowledge exchange activities. Most common are involvement of external stakeholders in education activities (96%), followed by joint research projects (92%) and collaboration on student internships (74%). Less practiced were lifelong learning activities (48%), different forms of technology and knowledge transfer (44%), and collaboration on secondments (29%), that is, the temporary mobility of staff, and industrial doctorates (7%).

Many of these activities were also observed during the study visits and the technology transfer offices play a central role. More efforts are needed to raise the awareness of existing opportunities for staff and students to get involved in these activities. In particular, international students need to be more involved (see Chapter 4).

Lifelong learning is becoming a key strategic area for many HEIs across Europe. In Hungary, a solid infrastructure has been established in medical and education professions. This is illustrated by two examples: i) the collaboration of General Electrics and Semmelweis University on digital solutions in healthcare, through a dedicated professional development programme for healthcare practitioners, and ii) the teacher training programmes in the Eszterházy Károly University of Applied Sciences.

Community outreach has traditionally been an area of strength for the HEIs in Hungary. An example is the annual national "Researchers Night". Every year all HEIs across the country organise a range of events for all age groups. Very popular have been interdisciplinary challenges and innovative solutions demonstrated by (young) researchers in an interactive, educating and entertaining way. In 2016, the most activities were organised in Budapest (around 35). Elsewhere, on average three activities were organised in cities with local HEIs. The leader was the city of Misckolc with seven activities.

There is always the risk that knowledge exchange activities remain uncoordinated across the HEI. A good way to overcome this and to make better use of relationships and internal resources is the recently started initiative at Semmelweis University to introduce a common calendar of events, which would, for example, signal to all staff and students that a well-known scientist from abroad is visiting or giving a lecture.

Close to half of the HEIs indicated that they have an incentive system for staff members who actively support the commercialisation of research, and a further 25% were discussing the introduction of such a system in their governing boards. The dominant practice for incentives for commercialisation is that they operate at the level of faculties/departments, whereas incentives for other forms of knowledge exchange are mostly directed to individual staff members.

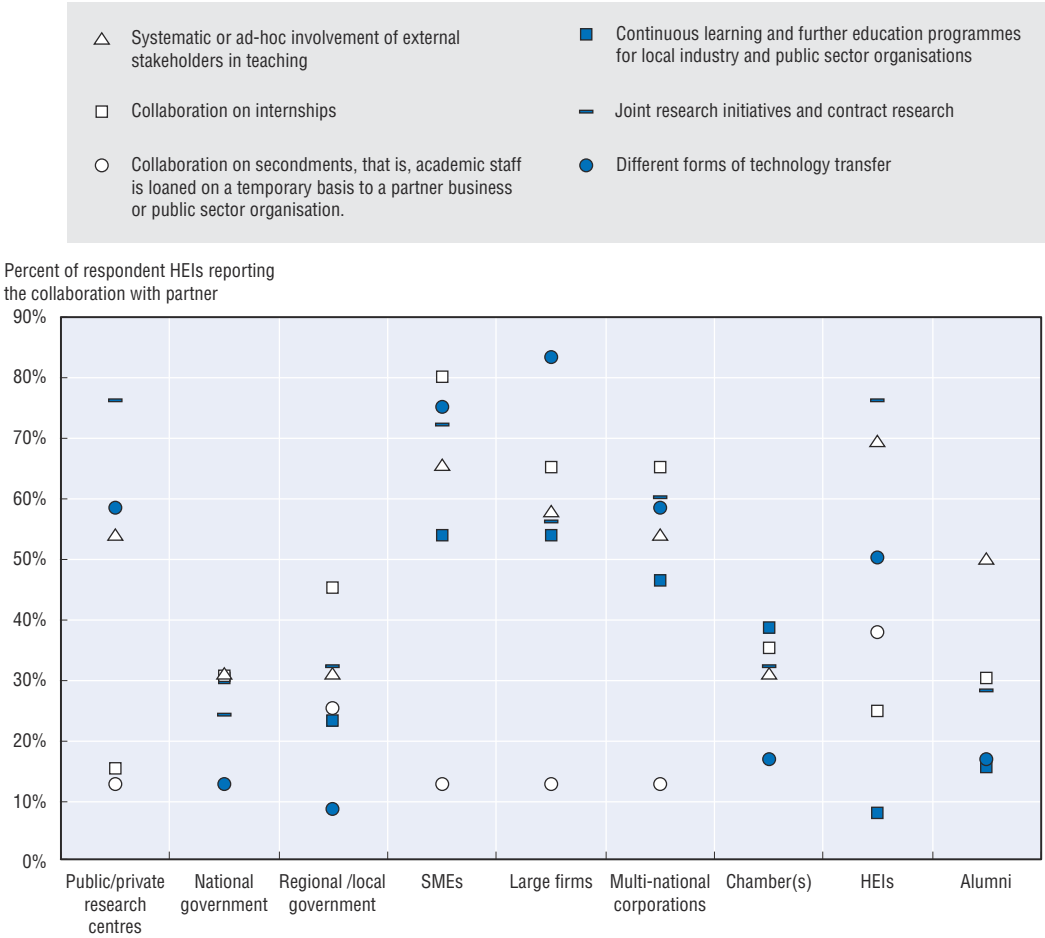
Application for external funding is a core activity of knowledge exchange and collaboration and can take considerable time for researchers. It is therefore important to provide horizontal services, which provide timely information about upcoming grants and collaboration possibilities, and assist researchers in grant applications and administrative procedures. From the study visits and discussions with key stakeholders within the higher education system, it appears that such horizontal support structures are not yet a common feature of Hungarian HEIs.

The HEI demonstrates active involvement in partnerships and relationships with a wide range of stakeholders

All surveyed HEIs collaborate with a wide range of stakeholders and 70% participate in the governing boards of local partnerships that steer and support local economic development (see Figure 2.3, above). The interviewed stakeholders from local governments, industry and businesses expressed an overwhelming desire to deepen their engagement and joint activities with HEIs and they believe HEIs are well-resourced in terms of academic know-how, specialised technologies and equipment which they could utilise. However, they expressed a view that HEIs seem to prefer to remain engaged only in teaching and learning and basic research and remain focused on citation indexes as opposed to wider stakeholder and community needs.

The surveyed HEIs reported to collaborate with a wide range of organisations in their knowledge exchange activities (Figure 2.13). Large firms and SMEs are key partners for different forms of technology transfer activities, and, together with multinational corporations,

Figure 2.13. **Partners of Hungarian higher education institutions in knowledge exchange activities**



Notes: Higher education institutions (HEIs) were asked: "Knowledge exchange can take on various forms. The focus can be on teaching, research or any form of strategic collaboration. Which of the following are currently practiced at your HEI?"; "Which of the following are currently knowledge exchange partners of your HEI?". A total of 28 HEIs responded (15 universities, 6 universities of applied sciences and 7 colleges of education).Data is shown for universities and other types of HEIs, which include the universities of applied sciences and the colleges of education. The HEIs reported to have knowledge exchange relationships with public/private research centres (21, 78%), national government (11, 41%), regional/local government (25, 93%), SMEs (25, 93%), large firms (24, 89%), multinational corporations (26, 96%), Chambers (20, 74%), other HEIs (22, 81%), and alumni (14, 52%). The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), HEI Leader Survey Hungary.

are regularly involved in the education activities of HEIs. Temporary mobility of HEI staff currently happens more within the higher education sector and between HEIs and public/private research centres than between HEIs and SMEs, large firms or multinational corporations. Large firms are the partners of the two doctorate programmes with industry. There is room to further develop contacts with local and regional government bodies, particularly as many HEIs seem to have close relationships with local and regional governments (e.g. participation in local strategic partnerships, participation in working groups, etc.).

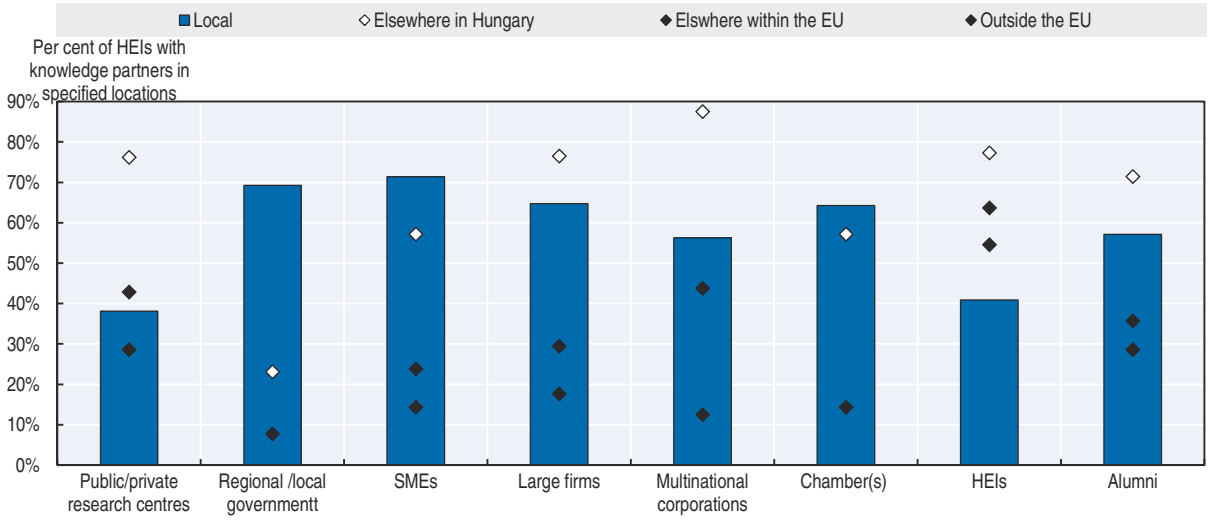
Alumni are not very engaged with their HEIs in Hungary. Alumni relationships are underdeveloped at the institutional level. Only half of the surveyed HEIs reported to have knowledge exchange partnerships with their former students. The study visit showed that in certain faculties personal contacts between academic staff and alumni are strong and

lasting. However, the lack of a more institutionalised engagement with alumni is a missed opportunity to strengthen ties between HEIs and the business community. Alumni can play an important role in the entrepreneurial agenda, for example as trainers and mentors, sponsors and gate keepers for research or education (e.g. traineeships) relationships with firms and public organisations.

All surveyed HEIs reported to have implemented a system of maintaining regular contact with their alumni, which included tracer surveys within the first year after graduation and beyond. Approximately two-third of HEIs obtain information on which of their alumni have started-up a business, but less than half informed alumni about the entrepreneurship promotion activities they offered. Career offices can play an important role in nurturing these contacts, for example through alumni associations, regular newsletters (e.g. the printed alumni magazine at Széchenyi István University), and the organisation of technical and cultural events.

The geographic radius of knowledge exchange partners is large for the surveyed HEIs (Figure 2.14). Contacts with public/private research centres are mainly within Hungary, however more than 40% of the surveyed HEIs reported to also have contacts within the wider EU area. Relationships with other HEIs occur at all levels of geographic distance and they account for more than half of the HEIs' links with partners outside the EU. Collaboration with regional/local governments is focused within close proximity to the HEI and, for close to one-quarter of the respondents, also elsewhere in the country. Relationships with SMEs are mostly local or national, and for one-quarter they are also in the wider EU area. Partners from large firms and multinational corporations are mostly located elsewhere in the country. Contacts with Chambers are either local or national. Relationships with alumni are mainly within Hungary but also have a global scope.

Figure 2.14. **Location of knowledge exchange partners of Hungarian higher education institutions**



Notes: Higher education institutions (HEIs) were asked: "Where are current knowledge exchange partners of your HEI located?". A total of 28 HEIs responded (15 universities, 6 universities of applied sciences and 7 colleges of education).Data is shown for universities and other types of HEIs, which include the universities of applied sciences and the colleges of education. The HEIs reported to have knowledge exchange relationships with local partners (19, 70%), elsewhere in the country (24, 89%), elsewhere within the European Union (17, 63%), outside the European Union (15, 56%). The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), HEI Leader Survey Hungary.

The HEI has strong links with incubators, science parks and other external initiatives

Contacts with incubators and science parks are not very developed, but demand from aspiring entrepreneurs for incubation services and co-working spaces is increasing. Only two HEIs reported in the HEI Leader Survey to have an incubator on campus and only one HEI reported to have a representative of a technology park participating in the HEI's governing board. More involvement exists in the entrepreneurship education activities, for which half of the HEIs reported to collaborate with science and technology parks and incubators in the design and/or delivery of activities.

The HEI provides opportunities for staff and students to take part in innovative activities with business and the external environment

Internships are a common practice to offer students the opportunity to participate in innovative activities with business and the external environment. More than two-thirds of the HEIs offer internships for their students; less than 40% have mandatory internships across most of their programmes at Bachelor and Master levels, and internships are not a common part of doctoral study programmes. Supports for students include, in order of current practice: access to information about internship opportunities (100%), continuous support during mobility (89%), and financial support (78%). Less common are mechanisms for participants to share their experiences with other students (67%).

Fewer initiatives exist to support the temporary mobility of HEI staff into industry and public organisations. Current practice was reported by only eight HEIs (31%); five HEIs, all universities, are discussing support measures for temporary staff mobility in their governing boards. The supports offered include, in order of current practice: incentives for staff to share their experiences after mobility (100%), information (90%), funding (89%), and continuous support during mobility (78%).

The HEI integrates research, education and industry (wider community) activities to exploit new knowledge

There are a number of examples of projects where HEIs bring together research, education and the business community (see Chapter 4).

Internationalised institution

The Tempus Public Foundation (TPF) is supporting Hungarian HEIs in their internationalisation activities, for example, in participating in international projects as partner or co-ordinator HEIs. TPF helps HEIs in their international partner search and has developed a guide for international students, teachers and researchers. The Hungarian government has launched a multi-year support programme for the internationalisation of HEIs. The first phase of the programme "Campus Hungary" ran from 2012-15 with the aim to support and facilitate the internationalisation of Hungarian higher education through providing institutional development and scholarships for students, academics and staff. Main outcomes of the project were professional courses provided to higher education staff on international marketing and student recruitment, intercultural workshops, innovative teaching methods, and international webpage development. Initiatives which have achieved significant results in supporting internationalisation through the Campus Hungary programme are continued in a priority project within the financing framework of the Human Resource Development Operational Programme managed by the Tempus Public Foundation, called Campus Mundi. The main goals of the Campus Mundi programme are i) supporting

HEIs in enhancing their international visibility through an increased offer of courses taught in a foreign language, and ii) supporting HEIs in their outreach activities (educational fairs, exhibitions and conferences). Supporting the development of HEIs includes capacity building, network building, conferences, developing networks of international co-ordinators, and peer learning activities. Enhancing the quality of institutional and student services is supported by compiling a guide for mentoring international students, by developing data sources and establishing online customer services. The internationalisation audit process is also continued through the involvement of new institutions and the revision of development for the ones already participating in the process.

Internationalisation is an integral part of the HEI's entrepreneurial agenda

Results from the HEI Leader Survey confirm that internationalisation activities are a priority for Hungarian HEIs, also with regard to knowledge exchange activities. Close to two-thirds of the surveyed HEIs reported to have partners from across the European Union for their knowledge exchange activities, and more than half reported to have global relationships (Figure 2.14, above). Internationalisation is an important issue in Hungarian higher education with a great emphasis on the recruitment of international students. All surveyed HEIs had either sections dedicated to international activities or a mention of international issues throughout their strategy documents; two HEIs reported to have dedicated internationalisation strategies. In contrast, entrepreneurship and knowledge exchange are far less present in the strategies. It will be important to build better synergies between the different strategic objectives, for example better connect the entrepreneurship support activities with the internationalisation activities, or target international students for start-up training (see Chapters 4 and 5).

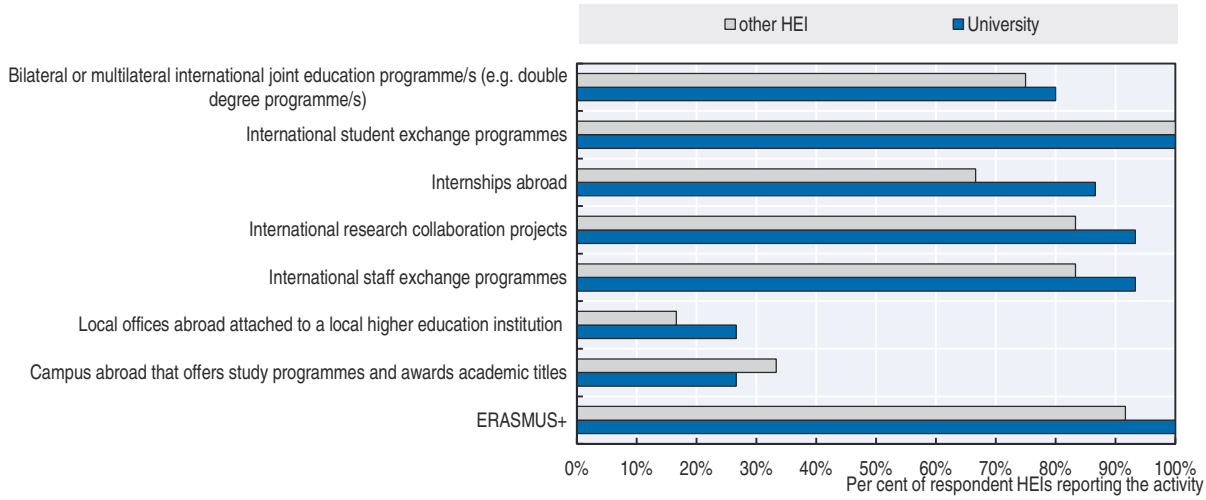
The HEI explicitly supports the international mobility of its staff and students

Studying in Hungary is attractive for students from abroad. In human and veterinary medicine, long-standing relationships exist with Germany and Austria, which have led to the establishment of recruitment and training structures in these countries. Several Hungarian HEIs offer preparation courses in the country of origin either in collaboration with local HEIs or outsourced to an international student recruitment agency. An interesting trend, which was also noticed for the HEIs visited as part of the HEInnovate Ireland review, is that prospective students from China, one of the largest emerging markets for student recruitment, are nowadays more interested in business and IT studies than in medicine and engineering.

The internationalisation offices in the HEIs support the faculties and departments to establish relationships with companies abroad, often through contacts with the local branches of the multinational corporations in geographic proximity to the HEIs. Debrecen University, for example, has faculty co-ordinators for the Erasmus programme, who help students to get prepared for international mobility and support staff members to identify possible industry partners.

Common internationalisation practices of Hungarian HEIs include collaboration within Erasmus+, which is part of the European Region Action Scheme for the Mobility of University Students, international student exchange programmes and student internships abroad, international research collaboration, and joint international education programmes (e.g. double degree programmes). Some HEIs also have local campuses aboard (Figure 2.15). Universities are slightly more active in these internationalisation activities than other types of HEIs.

Figure 2.15. **Internationalisation activities of Hungarian higher education institutions**



Notes: Higher education institutions (HEIs) were asked to report on their current internationalisation activities. A total of 28 HEIs responded (15 universities, 6 universities of applied sciences and 7 colleges of education).Data is shown for universities and other types of HEIs, which include the universities of applied sciences and the colleges of education. The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), HEI Leader Survey Hungary.

The HEI seeks and attracts international and entrepreneurial staff

In the HEIs outside of Budapest visiting professorships do not appear to be widely used and very few academic staff members are from outside Hungary. Less than one-third of the surveyed HEIs reported to have recruitment policies and practices that seek to attract international staff. An important challenge, which became obvious during the study visits, is that the salaries of academic staff are not internationally competitive. A number of approaches can be taken to increase the presence of international and entrepreneurial academic staff. In the first instance, fellowships can be used to attract young scholars, who might not be attracted primarily by a competitive salary but by a promising research environment, the entrepreneurial culture, the range of knowledge exchange activities, etc.

International perspectives are reflected in the HEI's approach to teaching

There are initiatives to enhance internationalisation of teaching activities. The ELTE University, for example, organises a monthly "English Breakfast" for English speaking staff. In the Eszterházy Károly University of Applied Sciences staff members are encouraged to go abroad for a teaching experience, and are supported to write an essay, which will be published on the Internet to motivate others and share with students what they have learned.

However, a key finding from the study visits is that there are only a few truly international education activities, which are attended by both Hungarian and international students. Many HEIs offer different courses for Hungarian and international students. At the same time, there is a lack of training to prepare educators for teaching in a foreign language and in a multicultural environment. This has been addressed at the Széchenyi István University with a specific training course offered for teaching staff in light of the planned introduction of new study programmes that are primarily aimed at an international audience.

Hungary has long been a preferred destination in central eastern Europe for students from the United States. The Aquincum Institute of Technology (AIT) has turned this into a

successful education model. AIT provides a unique English language study abroad experience for North American undergraduates majoring in computer science, software engineering, and related disciplines in Budapest. AIT is a private higher education provider, which collaborates closely with the Budapest University of Technology and Economics (BME). Instruction in small classes also includes BME students, for whom tuition is waived. For them, personal relations with the North American students may prove to be invaluable assets for their future careers. AIT's curriculum uniquely blends IT education with its home, Graphisoft Park's professional orientation in business studies. This is complemented by courses highlighting the richness of Hungarian culture (language, literature, film, music and architecture) tailored for the needs of international students.

Many of the entrepreneurship education activities have an international perspective, even if the focus might be more on theory and knowledge than on application. More than half of the HEIs reported that a focus on the international business environment is part of entrepreneurship education. However, two-thirds of the HEIs indicated that simulations or direct applications of how to internationalise an entrepreneurial initiative, that is, a project or a new venture, were present in the courses, but only rarely practiced.

The international dimension is reflected in the HEI's approach to research

Hungarian HEIs and their academic staff are generally very active in international research projects. This occurs most often through joint research projects with HEIs from other countries and, in some cases, also with multinational corporations. One of the mechanisms used to increase international research is through European Union Structural Funds and through Horizon 2020 Funds. So far, the international research collaboration is centred on basic research, an area in which Hungary is performing well in the central eastern European region. A challenge, which became obvious from the interviews during the study visits, is that application for funding of international travel can be difficult. To overcome this, HEIs could establish their own strategic travel fund to support staff travel if project funding prohibits this.

Measuring impact

The HEI regularly assesses the impact of its entrepreneurial agenda

Overall, HEIs do not systematically assess the impact of their entrepreneurial agenda. However, some new development in this direction can be expected as almost half of the surveyed HEIs reported that they are discussing the introduction of performance indicators for the entrepreneurship objectives (see Figure 2.1, above), and the knowledge exchange activities. There are some efforts to track and measure entrepreneurial activities within various units of the HEIs. For example, senior management is often interested in tracking the number of partnerships with industry and international co-operations. All the HEIs visited had detailed descriptive information on these activities but none attempted to assess their impact.

Career offices typically track the labour market outcomes of graduates. An example is the so-called Neptun tracking system established at Szent István University, which contacts students one year, three years and five years after graduation and performs a longitudinal analysis of labour market outcomes. Szent István University is one of 33 HEIs in Hungary which participate in the national survey of labour market outcomes of higher education.

The HEI regularly assesses how its personnel and resources support its entrepreneurial agenda

At present, Hungarian HEIs do not appear to put much effort into assessing how their personnel and financial resources are used to support the entrepreneurial agenda. The challenge for HEIs in undertaking more rigorous assessments of how their human resources are deployed is that contributions to the entrepreneurial agenda and third mission activities are not considered by the processes that determine the career paths of academic staff. A promising example of an HEI attempting to assess whether its human and financial resources are used in the most effective and efficient manner to support its entrepreneurial agenda is the OKRA performance management system, recently introduced in the Eszterházy Károly University of Applied Sciences in Eger (see Chapter 3).

The HEI regularly assesses entrepreneurial teaching and learning across the institution

The HEI Leader Survey indicates that more than half of respondents undertake formal evaluations of the entrepreneurship education activities; in most of the cases this is an obligatory procedure. The focus is on competence development and satisfaction of participants; none of the HEIs measure the motivation to start-up a business. Two-thirds were using a standard questionnaire instead of a specifically tailored survey instrument; one HEI reported that entrepreneurship education activities were also evaluated with the help of a focus group. Where a questionnaire was used, it was in most cases administered at the end of the course (88%) and only in two HEIs was multiple administration practiced.

Some examples of informal assessments were observed during the study visits, where professors teaching entrepreneurship undertake a survey of their students to assess their attitudes, knowledge and motivations in entrepreneurship. Such evaluations are often used for the research activities of the professor and are also used to adjust the course content. These activities rely, however, on the initiative of the individual teachers and are not systematically undertaken across all entrepreneurship courses.

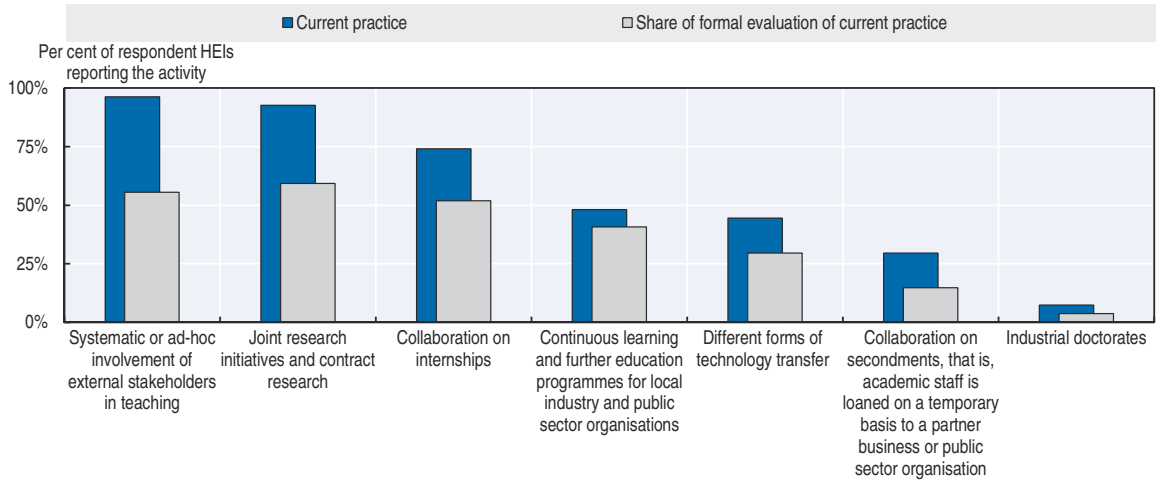
The HEI regularly assesses the impact of start-up support

During the study visits it was observed at all HEIs that a basic but comprehensive set of metrics is collected on start-up support services for researchers and academic staff. This includes, for example, the number of patents filed in Hungary and internationally and the value of spin-offs. However, there were no examples of HEIs using this information to assess the impact of the investments in these support services. Survey results indicate that far less effort is put into the assessment of start-up support compared to entrepreneurship education activities. Here, more frequent practice can be expected, as more than 40% of the HEIs reported that they are discussing the commencement of formal evaluations of start-up support measures in their governing boards.

The HEI regularly assesses knowledge exchange and collaboration

Formal evaluation of knowledge exchange activities is not yet widely practiced in Hungarian HEIs. Most of the surveyed HEIs reported to have formal evaluation practices in place for their lifelong learning activities for local industry and public sector organisations; most of the pilot initiatives on industrial doctorates are also evaluated by the HEIs. All other knowledge exchange activities seem to have evaluation gaps, particularly the systematic involvement of externals in teaching and joint research initiatives, which is practiced by almost all surveyed HEIs but formally evaluated in only half of them. A significant gap can also be noted for the joint research initiatives of the HEIs (Figure 2.16).

Figure 2.16. **Evaluation practice of knowledge exchange activities in Hungarian higher education**



Notes: Higher education institutions (HEIs) were asked: "Knowledge exchange can take on various forms. The focus can be on teaching, research or any form of strategic collaboration. Which of the following are currently practiced at your HEI?". For each of the reported knowledge exchange practices the HEIs were asked "Is there a formal evaluation practice of these knowledge exchange activities?". Percentage shares of formal evaluation of a specific knowledge exchange practice are shown. A total of 28 HEIs responded (15 universities, 6 universities of applied sciences and 7 colleges of education).Data is shown for universities and other types of HEIs, which include the universities of applied sciences and the colleges of education. The overall survey response rate was 53%. The survey response rates per HEI type are the following: universities (54%), other HEIs (52%).
Source: OECD (2016), HEI Leader Survey Hungary.

Lifelong learning programmes are the most commonly evaluated activities, whereas collaboration on secondment and industrial doctorates are the least evaluated. These are, however, also relatively new practices. The study visits confirmed these results. All the visited HEIs had detailed metrics on the number of collaborative research projects, the number of patents, the value of spin-offs, the number of staff and students involved in exchanges and more. There is room, however, for the HEIs to go beyond collecting metrics by undertaking more sophisticated impact evaluations to understand the value of these activities to the HEI, including understanding which activities are the most valuable.

The HEI regularly assesses the institution's international activities in relation to its entrepreneurial agenda

The HEIs visited all track their international activities with considerable detail. Each of the HEIs is able to report the number of collaborative research projects with private sector businesses and with other HEIs, both in Hungary and abroad. Further, they also track the number of staff and student exchanges (e.g. Erasmus+), including both in- and out-flows. However, there is room to undertake more sophisticated impact assessments to understand where further investments would have the greatest effect.

Recommendations for public policy action

Develop a common definition of the third mission in higher education institutions

Involve all higher education stakeholders in this and facilitate the establishment of consultative and collaborative fora at the local/regional level to enhance impact. Agreeing performance compacts with each HEI could be considered as part of the Ministry of Human Capacities' review of the progress made by the HEIs in the implementation of their recently submitted strategic plans.

Introduce viable funding mechanisms for the third mission in higher education institutions

Showing commitment in terms of financial investment is a key first step to establish third mission activities, which are linked to the other key missions of the HEI. It is essential that the third mission is referenced in existing financial models both at the national and institutional levels.

Stimulate collaboration between higher education institutions in strategic areas

In some industries (e.g. pharmaceuticals and biotech) the market is dominated by large multinational players and Hungary is likely to occupy only a small part of their global network. A collaboration of HEIs around strategic areas with shared-use agreements for costly research equipment, for example national research centres with the participation of different HEIs and public research organisations, can help to build competitive strengths in global/regional niche areas. A national-level initiative to facilitate collaboration between HEIs and multinational corporations can also strengthen these strategic areas.

Strengthen the support infrastructure for venture creation in and around higher education institutions

The aim should be to establish basic support for new venture creation within HEIs, which is fully embedded within the wider ecosystem. Finding an approach that matches given resources with the needs of nascent entrepreneurs should be the starting point. Not all HEIs will be capable or willing to establish their own support infrastructure. Collaboration with other HEIs should be supported to close eventual gaps, for example, through a shared-service organisation for start-up support and technology transfer. Current regulations for creating spin-offs should be simplified and HEIs should not take equities from student start-ups.

Facilitate the establishment of consultative and collaborative fora at the local/regional level to enhance impact of entrepreneurship, innovation and the third mission

It is essential that the third mission is referenced in existing financial models both at the national and institutional levels. Stakeholder participation in the development, implementation and review of third mission strategies is essential for their successful implementation and appropriate stakeholder fora should to be established at regional and national levels. Ideally, at the regional level, HEIs should play a key role in steering the work of the fora.

Build a common information and data framework for the impact of entrepreneurship, innovation and the third mission

Hungary already has a rich data collection infrastructure. Gathering the different data sources into one common system may require the expansion or establishment of new government based units or agencies within appropriate ministries who are tasked with identifying, monitoring and analysing relevant data and information which can be used to provide updates and reports for different stakeholders.

Recommendations for higher education institutions

Develop a common understanding of the third mission and the entrepreneurial agenda specific to the HEI's profile and expectations

This includes a participatory process involving staff, students and key external stakeholders to identify what the entrepreneurial agenda implies for the HEI, a prioritisation

of third mission activities, and mechanisms to support the implementation of these activities, enhance institutional spill-over effects, and capture and measure the impact of the entrepreneurial agenda. The HEInnovate tool provides a useful framework for this.

Appoint a senior manager with responsibility for entrepreneurship, innovation and the third mission

Firstly, the temptation naturally exists for entrepreneurship, innovation and the third mission to be given either as an additional task to an existing manager or spread across the workload of a number of existing managers given the current volume of activity in the area by comparison to other jurisdictions. This approach should be avoided given the future importance being attached to the entrepreneurial agenda by both government and HEIs. It is recommended, in the short to medium term, that responsibility for management of the overall entrepreneurial agenda needs to reside with one senior manager, who is solely responsible for this, and who is given the appropriate authority and resources to deliver on the agenda.

Introduce viable resource allocation mechanisms to support entrepreneurship, innovation and the third mission, including incentives, an innovation fund and horizontal support services

Basic organisational and structural arrangements that nurture synergies between education, research and third mission activities should be supported by core funding. Revenue generated from third mission activities should go into strategic reserves which can then be deployed to support the development of strategic initiatives that strengthen the embedding of third mission activities into education and research with the aim to enhance their impacts.

Introduce professional development and mobility programmes for staff related to entrepreneurship, innovation and the third mission

Investment in staff mobility programmes for the purpose of gaining further knowledge and insight into business, industry and community requirements, as well as the expertise of international partner HEIs, will be essential components of any professional development programme.

Enhance the involvement of students and young researchers in entrepreneurship, innovation and the third mission

For students, a greater offer of education activities which develop entrepreneurship as a key competence and collaboration with student associations could enhance active involvement in third mission activities. For young researchers, active scouting activities could be developed to increase the number of research results that lead to transfer and application activities. Particular attention should be on students and staff returning from international mobility, as well as international students and staff. A promising way of raising interest in entrepreneurship is to promote role models and to celebrate their successes, for example in a public "Start-up Day" organised at the HEI. Student organisations can play an important role in this.

Provide basic support for new venture creation, well-embedded in the wider start-up ecosystem

Basic start-up support offered in HEIs should be connected with the more specialised support structures organisations present in the wider start-up ecosystem. To this end, the

HEI-internal support offer should be widely communicated inside and outside the HEI. Offering a smooth transition for new ventures from basic to advanced support services requires strong collaboration with local, regional and national organisations providing business start-up and development support.

Build capacity at institutional and individual levels to understand, document and measure impact

There is a significant gap in the availability of information about the quantity and quality of activities and their impact on learners, firms, and the HEI itself, to name but a few possible areas of impact. It is recommended to introduce training and support for staff and students to develop impact awareness and their ability to contribute to the HEI's efforts to capture and measure impact. This also includes effective mechanisms to reach out to alumni and former researchers later in their careers.

Notes

1. The HEIs were asked, in the questionnaire, whether and to what extent knowledge exchange, entrepreneurship or internationalisation were present in their strategy
2. Team Academy is based on the award-winning Tiimiakatemia approach, which was first introduced in 1993 by Johannes Partanen at Jyväskylä University of Applied Sciences in order to combine the worlds of business and education.

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Chapter 3

Enhancing the organisational capacity of Hungary's higher education institutions

This chapter expands on the findings of Chapter 2 related to organisational capacity, mission readiness, funding, people and incentives. Transforming Hungarian Higher Education Institutions (HEIs), of which many have long-standing traditions, is a long-term process and not free of barriers. Decreasing public funding for higher education is coupled with decreasing numbers of students and graduates. The current administrative and academic structures, core institutional funding, and the allocation of staff time are still oriented towards a dual mission model. The chapter explores current strategies and practices to further anchor entrepreneurship, innovation and the third mission, and provides recommendations and learning models on how strategy, resources and support structures can create and sustain synergies across the HEI's different functions.

Introduction

Hungary has a strong tradition in higher education which dates back over several centuries. After foundation attempts in the 13th century, the first Hungarian university, with faculties of law and medicine, was established in the town of Pécs in 1367. Pope Orban V, in his Bill of Endorsement, ordained that this university shall last forever; regrettably the prevailing political environment meant that it only survived for a decade (Hungarian Government, 2002).

Hungary's modern higher education system emerged in the 20th century and reflects the evolution of a higher education system with a rich history in which its academic community both past and present have made significant contributions to the advancement of the collective knowledge of global society. The country's huge contribution to the world's intellectual heritage includes many Hungarian-educated Nobel Prize winners from the first, Philipp Lenard (1905), for his work on Cathode rays, to the most recent, Avram Hershko (2004), for his work on protein degradation. Famous Hungarian inventions include the ball-point pen (Biro), phosphorous matches (Irinyi), the electric train (Kandó) and the telephone exchange (Puskás). Aside from scientific creativity, Hungary has also produced a long list of famous composers, painters and artists, including Zoltán Kodály, Béla Bartók, Victor Vasarely and Jenő Ormandy (Hungarian Rector's Conference, 2015).

Since its creation, the Hungarian higher education system has experienced many changes, both positive and negative. One of the most significant changes, for which the higher education system appears to be still catching up, was implemented as part of Hungary's integration into the Soviet Block. Following the Second World War, Hungarian universities were subject to a series of reforms aiming to eliminate academic freedom. Soviet schoolbooks and curricula were implemented, and Marxism and Russian language were made obligatory subjects. The principals of admission were based on the ideologies of the administration, and strict central governance eliminated the autonomy of the universities (Hungarian Government, 2002). Hungary emerged from the Soviet Block as an independent nation some 25 years ago. Since then, successive governments have implemented extensive development and integration strategies in order to advance the economic, social and cultural integration of the state within the EU. Higher education has not been exempted from this process with numerous new policies, strategies and laws being implemented and enacted.

Hungary has made significant advances since its entry to the EU, but still lags behind other western EU member countries in terms of tertiary education indicators. For example, tertiary education attainment among young adults (25-34 year-olds) in Hungary stands at 32%, which is 9 points behind the 2014 OECD average of 41% (OECD, 2015a). Furthermore, the dropout rate in higher education remains very high in comparison with other jurisdictions at 47% in 2011 (OECD, 2015b). In terms of adult participation in lifelong learning, participation remains very low at 3.2% compared to an EU average of 10.7% in 2014 (ibid.).

In a further bid to improve performance relative to other EU countries, in December 2014 the government approved the Higher Education Strategy "A Change in Pace in Higher

Education" and amended legislation accordingly (Hungarian Government, 2014). The strategy sets the agenda for the development of the Hungarian higher education system over the next 15 years, aiming to achieve a 35% tertiary attainment rate by 2023. The objectives of the strategy are to i) establish a performance-based higher education system and improve its quality; ii) boost the research element of higher education and research careers; and iii) strengthen links between local/regional businesses and higher education. The main action areas of the strategy can be summarised as follows:

- Rationalisation of the programme structure and content: based on the new Graduate Tracking System, the number of programmes will be cut by 15% by 2020.
- Increasing entry and outcome requirements as well as opening up pathways to higher education based on recognition of prior learning.
- Establish a new type of institution, the "higher education centre for community based studies" with a view to making higher education more accessible in regions without higher education institutions.
- Quality assurance: launching new programmes will become easier, but checking on processes and outcomes will be stricter.
- Governance structures: aiming to strengthen the non-academic management of institutions, two new structures have been introduced, namely the chancellor's office and the consistory.
- Co-operation with businesses and research will be facilitated through regulations promoting more flexible use of state funding and attracting private funding. There will be a career system for researchers and more opportunities for start-ups and participation in innovative projects.

Allied to the above strategy, a key consideration going forward is the mission of the higher education institutions (HEIs) in Hungary which is currently largely based on a traditional dual mission model focused on teaching and learning, and research activities. In the current technological and globalisation era, a new third mission encompassing engagement with industry, business and society has emerged as an essential component of the mission and strategy of any higher education institution. HEIs and their associated stakeholders, including governments around the world, have recognised the need to advance the engagement mission of HEIs.

This need has clearly been recognised by the Hungarian Government in two ways. Firstly, in the implementation of the Higher Education Strategy which seeks to boost the research element of higher education and strengthen links between local/regional businesses and higher education. For example, among the main changes introduced recently as part of the implementation of this strategy was the introduction of new practically oriented bachelor programmes, the dual training system (see Chapter 1). And, secondly, through the implementation of new governance and management structures focused on the creation of a more strategic and entrepreneurial approach within the HE sector. Previously, rectors had final responsibility for all decisions made by universities. Since 2014, there is a chancellor appointed by the Prime Minister in each public higher education institution. Chancellors are executive heads with final responsibility for financial and economic decisions, while rectors retain final responsibility for teaching and research decisions. As academic and financial decisions are typically closely linked, the chancellor has a crucial position in the steering of the HEI, including effective allocation of resources. A five-member body, three members delegated by the minister responsible for higher education plus the

rector and chancellor of the institution, sets long-term strategic goals for the HEI, including adopting the medium-term institutional development plan and the annual budget programme.

In developing the third mission of the higher education system in Hungary certain limitations and potential boundaries need to be understood and taken into account, including:

- The current weak financial position of the state and its associated institutions, including HEIs, which has seen the expenditure per student at tertiary level decrease by 15% between 2008 and 2012, while the number of students decreased by 7%.
- The legal and contractual framework applying to HEIs and their employees which is very focused on the dual mission model in terms of staff workload.
- The significant restructuring and re-organisation of the HE structure within Hungary, which although may be seen as necessary by some, creates a significant workload in its own right and is often not integrated in a strategic way with HEI mission-based activities. As such, it can act as a significant distraction to the delivery of the core mission of HEIs.
- Current administrative and academic structures within HEIs which are often not appropriate to the delivery of third mission activities.
- The availability of external support from relevant stakeholders, including business and industry, which is limited in comparison to other jurisdictions.

The remainder of this chapter explores the views presented by various stakeholders in relation to the above themes, examples of good practice and achievements, key challenges, recommendations and learning models for consideration.

Analysis and findings

Committment to third mission development

In terms of organisational capacity and mission readiness, the Hungarian higher education system can point to several strengths and achievements which are most clearly demonstrated in the strong desire, commitment and recognition by all stakeholders of the need to develop and continue to evolve a vibrant and sustainable third mission within the Hungarian higher education system. For example, in interviews with government agencies the commitment of government to the development of a three-mission culture within the higher education system was highlighted through the recent adoption and implementation of several key strategies, policies and initiatives, such as the new national strategy for higher education "A Change of Pace in Higher Education" (Hungarian Government, 2014) and the National Research and Development and Innovation Strategy for the period 2013-20, "Investment in the Future, National Research and Development and Innovation Strategy" (Hungarian Government, 2013). In their view the implementation of the third mission agenda will not be an immediate process and will require careful consideration, implementation and on-going review.

The senior management teams at the HEIs visited also demonstrated their commitment to the development of the third mission for the benefit of all stakeholders including the student body. It was also evident that senior management support government policy and initiatives created for the development of the HEI third mission agenda and are developing institutional strategies in support of this. In their view, the embedding of third mission activities will further enhance the position of HEIs as key drivers in the economic, social and cultural development of their cities, regions and country. Further, they believe the expansion

of third mission activities may also contribute to the improvement of the financial position of HEIs.

A promising step in this direction is the Teacher and Researcher Quality Assessment Scoring System (OKMR) at the Eszterházy Károly University of Applied Sciences (Box 3.1). The deployment of this type of system across all HEIs within Hungary would clearly benefit the development of a three-mission model. In the first instance, it provides a consultative platform which allows for discussion and agreement on engagement in third mission activities, but it also allows for the development of detailed, discipline specific knowledge maps which would identify available staff strengths for deployment in support of external engagement and third mission activities.

Box 3.1. **Quality Assurance at Eszterházy Károly University of Applied Sciences**

The OKMR system developed at the Eszterházy Károly University of Applied Sciences forms an integral part of the mechanisms the institute intends to deploy to meet the objectives of its institutional strategy. Key to its success has been its development in consultation with staff, and the fact it took on board best practices that existed in other assessment systems from other HEIs.

The OKMR system – through a consultation process between line managers and staff members – allows not only for the creation of a personal evaluation profile and work-plan, but also a personalised staff development profile focused on how best to improve the professional and personal development of the individual staff member. Participation and performance in the OKMR process does not affect the salary of individual staff members, but it is intended that outcomes could be used for promotional purposes. Not only will the system profile individuals, but the intention is to create knowledge maps in disciplines which will provide detailed information on staff expertise available within specific departments which could be deployed in support of the development of third mission activities.

Source: Interviews at Eszterházy Károly University of Applied Sciences during the study visit in March 2016.

It was universally accepted that third mission activities will benefit the learning experience of the student body. Hungarian students who were interviewed as part of this study were very aware of the personal and career benefits arising from their exposure to third mission activities as part of their studies. Students are actively seeking and will increasingly demand courses which provide them with these types of opportunities. Indeed, students interviewed as part of this study believe their courses could be improved and made more fit for purpose in terms of work readiness and expressed concern that students in other jurisdictions have a distinct advantage over them due to their higher level of exposure and greater level of support with respect to business, industry and third mission activities. A learning model for other HEIs in Hungary is the Audi Hungarian Faculty of Automotive Engineering at the Széchenyi István University (Box 3.2).

In terms of the future, there is no doubt significant further potential and strength exists internally in HEIs within the student and staff body and externally in industry and business to enable evolution of the third mission agenda. Indeed, external stakeholders expressed an overwhelming desire to deepen their engagement and joint activities with Hungarian HEIs and they believe HEIs are well resourced in terms of academic know-how, specialised technologies and equipment which business and industry could avail of. Similar to state and

Box 3.2. **Audi Hungarian Faculty at the Szechenyi István University**

Széchenyi István University, in association with Audi Hungary, has developed a multi-level partnership which has led to the creation of the Audi Hungary faculty of Automotive Engineering within the university. The main aim behind the development of the faculty, is the provision of education and applied research programmes targeted at strengthening and further developing the skills and expertise available in the region to support the expansion and development of its automotive industry. Audi Hungary has provided investment through the provision of direct finance, equipment and expertise.

The university has prioritised the development of the faculty in terms of staff deployment and infrastructure development. Both partners have seen benefits accrue from the partnership with, for example, the university students gaining invaluable experience and exposure to cutting edge automotive technology and training and Audi Hungary being able to access academic expertise within the University to assist in the development of new technologies relevant to their industry.

The greatest beneficiary of this collaborative third mission initiative between the largest employer in the region and the principal provider of higher education is the region itself, as this initiative seeks to ensure the supply and development of the most appropriate skills and expertise needed to ensure the continued presence and expansion of the automotive industry in the region. A model of this type could be employed in other regions in Hungary between higher education providers and industry with a view to developing centres of academic expertise to support the development of skills and knowledge required to strengthen and grow specific regional industries.

Source: Interviews at Széchenyi István University during the study visit in March 2016.

government agencies, external agencies agree that without the participation of HEIs the development of the country's innovation system will be in jeopardy.

A less recognisable strength lies in the fact that the Hungarian system is currently at a developmental stage in terms of the third mission agenda and has the advantage of having a blank canvas, which presents a real opportunity to learn from the good practices of others. An example of a learning model that could be explored in terms of engagement and the third mission is the approach taken in Ireland (Box 3.3).

Box 3.3. **HEI engagement with wider society and internationally in Ireland**

In its most recent national strategy for higher education, the Irish Government defines the mission of higher education institutions as encompassing three inter-connected elements, which are i) teaching and learning; ii) research; iii) engagement with wider society and internationally. The strategy recognises that engagement by higher education with wider society takes many forms. It includes engagement with business and industry, with the civic life of the community, with public policy and practice, with artistic, cultural and sporting life and with other educational providers in the community and region, and it includes an increasing emphasis on international engagement.

The national strategy seeks to ensure that engagement with the wider community becomes more firmly embedded in the mission of higher education institutions. To achieve this, the strategy outlines the actions which higher education institutions will need to take, which include:

Box 3.3. **HEI engagement with wider society and internationally in Ireland** *(cont.)*

- Encourage greater inward and outward mobility of staff and students between higher education institutions, business, industry, the professions and wider community.
- Respond positively to the continuing professional development needs of the wider community to develop and deliver appropriate modules and programmes in a flexible and responsive way.
- Recognise civic engagement of their students through programme accreditation, where appropriate.
- Put in place structures and procedures that welcome and encourage the involvement of the wider community in a range of activities, including programme design and revision.

In addition, it was also recommended that the Higher Education Authority conduct a national survey of employers on a regular basis and that this should be used as part of an assessment of quality outcomes for the system.

Source: OECD/EC (2017a).

Finally, although it was clear there were differing views among the stakeholders in terms of mission readiness and organisational capacity, strong common themes resounded among all stakeholders namely the need to further develop third mission capacity and associated activities within HEIs, and the desire of all stakeholders to be involved in the development process.

Future challenges

There is no doubt that significant change will be required in the culture, mission objectives, organisational structure and capacity of the higher education system in order for it to embrace and regularise the third mission agenda within the ecosystem of all HEIs. The issue essentially revolves around ensuring the evolution of the higher education system to a three-mission model (education, research, third mission) from a predominantly two-mission model where the culture and modus operandi of HEIs remains focused on the dual mission of education and basic research.

In support of this view, government agencies highlighted their understanding that HEIs in the country have a long and established traditional two-mission focus on teaching and learning, and basic research. However, in their view, the mission of HEIs needs to evolve to include engagement and entrepreneurship activities at their core, with a view to HEIs further contributing to improving the economic and social fabric of Hungary. Government also views the development of the third mission as a potential way to enhance and improve the financial profile of HEIs through interaction with industry, business and the international community.

Industry and local/regional government partners of HEIs agreed that HEIs have made a significant contribution to the state, economy and society through the provision of well-qualified graduates and the creation of academic knowledge. However, they expressed a view that HEIs appear to have a preference to remain engaged in only teaching and learning, and basic research and remain focused on citation indexes as opposed to customer needs.

To achieve the three-mission model will not be an insignificant task and will require significant consultation and investment, careful planning and sequential implementation

over a relatively long time period. The challenges presented in the successful evolution of the system are also hampered by what some describe as the excessive re-organisation and restructuring currently underway in the sector. This is placing significant stress on the system and is proving to be a resource intensive distraction which appears to have no positive impact on the delivery of third mission activities.

A further significant challenge is the lack of a co-ordinated approach in HEIs to the communication of strategic objectives both internally and externally. Little awareness exists among the staff or students of government and HEI senior management third mission development plans. Furthermore, limited, if any, consultation has occurred between HEI management and government agencies, and staff and student stakeholders in the development of these plans and strategies. For example, the public consultation process conducted as part of the development of the new Higher Education Strategy was rather truncated, lasting only two weeks, which would be seen as a very short time period in comparison with consultation processes in other jurisdictions.

Aside from an apparent lack of consultation, there also appears to be limited confidence, trust or buy-in among internal stakeholders in the strategies and plans of government and HEI management. With respect to the engagement agenda, limited evidence of internal communication, implementation or review mechanisms existed within the HEIs visited, which are essential to drive the development of the third mission agenda. Allied to the above, few fora, if any, exist to enable regular consultation and communication to occur between internal and external stakeholders at both a strategic and operational level.

Connecting the implementation of strategic plans and stakeholder activities, both internally and externally, will be key to the successful implementation of the third mission agenda and associated activities. This is currently significantly hampered as no regional or area plans or fora are in place within Hungary which could drive economic development or utilise the third mission capabilities of all HEIs.

Resourcing the change agenda will also be very challenging given the current financial position of the state, the decline in student enrolments in recent years, which can only negatively impact on calls for increased investment in higher education, and the lack of significant alternative funding sources from business, industry or enterprise in comparison to other jurisdictions. Students are very aware of the poor financial position of their HEIs. They are concerned about how this occurred, and hope investment in higher education will be prioritised in the future. Academic staff expressed their concerns about the financial position and sustainability of HEIs and their ability to expand third mission activities due to a lack of resources. In terms of HEIs being able to deliver on their strategies, academics also expressed concern that significant numbers of experienced academic staff are leaving academia due to the lack of competitiveness of state salaries in comparison to industry.

Another regrettable occurrence in the complex resourcing matrix is the fact that the funds generated through third mission activities are often used as a way to shore up existing financial gaps, as opposed to dedicating these funds to the creation of the new third mission approach to education for the benefit of all stakeholders, and in particular the student body.

Further challenges include the current lack of effective structures to support third mission activities as well as the selection of the most appropriate structure going forward. In support of this opinion, external agencies expressed the view that no systemic entrepreneurship and innovation support structure currently exists within the higher

education system and few mechanisms and avenues exist to allow external stakeholders to connect with HEIs. Academics also believe there is limited or no organisational structure in place to effectively support third mission activities and they would have limited trust in any new systems being proposed by management or government. In their view, there were no mechanisms available to incentivise involvement in research let alone third mission activities. Further, existing support systems for research and innovation are overly centralised, bureaucratic and restrictive and do not promote involvement in activities outside of teaching and learning. In the view of third mission support staff, there are insufficient resources available to support their activities and there is no readily available organisational structure to enable successful engagement with academic staff and external stakeholders. They also believe there has been little traction in the creation of innovation and entrepreneurship activities among the academic community due to their existing commitments and a lack of incentives to entice them to participate in third mission activities.

Key to the development of effective structures to support third mission activities will be the definition of the roles of staff operating within these structures and the introduction of staff incentive and support mechanisms to encourage third mission participation, which are currently lacking. Going forward, how new staff are recruited, deployed and trained will be an important consideration in the successful development of the third mission agenda within HEIs.

Finally, creating greater collaboration among HEIs in order to maximise the potential impact of the higher education system is essential to the future success of any third mission agenda. Currently there appears to be no desire among HEIs in Hungary to pool or cluster efforts in a bid to drive the third mission agenda. Significant competition remains in certain disciplines within the higher education system, which is regrettable considering, for example, Hungary's strong reputation in areas such as medicine and the associated health sciences which could only be improved and augmented through a collaborative approach. As part of the current round of HEInnovate country reviews, a number of excellent examples of this were observed. An example is the collaboration of different higher education institutions in Amsterdam (Box 3.4).

Box 3.4. **Joining efforts in knowledge exchange: Higher education institutions in Amsterdam**

Knowledge dissemination and exploitation, or what in the Netherlands is commonly referred to as "valorisation", has a strong standing in the Dutch higher education system. In the Amsterdam region, the management of the main HEIs, that is, the University of Amsterdam (UvA), the Vrije University of Amsterdam (VUA), and the Amsterdam University of Applied Sciences (AUAS) join efforts and resources in a pan-Amsterdam valorisation strategy. These HEIs are all different in terms of their study programmes and student profiles, but they are all firmly rooted in the city of Amsterdam.

A key location for valorisation in Amsterdam, is the Amsterdam Science Park, which is home to the science faculties of UvA and VU and one of the largest concentrations of natural sciences in Europe. This unique juncture of prestigious education, high-quality research and knowledge-intensive business has been carefully cultivated to stimulate innovation and collaboration.

Box 3.4. **Joining efforts in knowledge exchange: Higher education institutions in Amsterdam** *(cont.)*

The Amsterdam Center for Entrepreneurship (ACE) is located in the Amsterdam Science Park. ACE started in 2006 within UvA in the Faculty of Economics and Business as a new research center. In 2010, the separate entrepreneurship centres were merged into ACE. Supported by the municipality of Amsterdam, the Ministry of Economics and new business partners Rabobank and Ernst & Young, ACE has become a leading address for entrepreneurship support for students and researchers. It was the first Dutch organisation to win the European Enterprise Award in the category "Invest in Skills" in 2011.

Source: OECD/EC (2017b).

A key future development target for the Hungarian higher education system is the need to develop a new educational model for the benefit of all stakeholders, but in particular the student body. This involves HEIs transitioning to an embedded three-mission model rather than the current traditional two-mission model.

Achieving this is to be considered as a long-term objective and immediate deficiencies and weaknesses in the system should not be allowed to dominate or interfere with the successful implementation of the principal aim. Given that this is a significant change management project, which will fundamentally change the culture of HEIs in Hungary, significant new communication, organisational, implementation and review systems will have to be put in place. This will require significant investment in terms of resources but also stakeholder commitment. In terms of organisational capacity and mission readiness the following actions are recommended.

Strategic planning and implementation

All stakeholders need to be involved in the development and roll out of strategies focused on the development of third mission activities to ensure buy-in, participation and appropriate communication. Within the HEIs this will require the establishment of a strategic planning group made up of representation from management, staff, students and external experts both from Hungary and, if possible, abroad. This body should be charged with the development, implementation, communication and review of a comprehensive and integrated strategy to deliver on the third mission agenda. Given the priority attached to this objective, this group should have a senior manager appointed as a sponsor who has the appropriate authority and resources to deliver on the plan.

Where possible, HEIs should identify a mentor/partner HEI from outside the jurisdiction to provide advice, guidance and assistance with the development and implementation of the strategy. Suitable mentor/partner institutions could be identified from the HEInnovate network of HEIs or the European Consortium of Innovative Universities.

The creation of strategic planning groups should not be limited to the HEIs. The Ministry for Human Capacities and the Directorate of Higher Education should establish a high-level advisory and implementation group charged with monitoring the ongoing development of a national strategy for third mission activities. This group should include membership from government agencies, HEIs, their partner organisations, international experts, and the student body.

Vital to the implementation of any strategy, either at an institutional or national level, will be the level of autonomy and flexibility available to HEIs to make strategic decisions to enable delivery on third mission activities, including financial decisions, with a view to allowing them to respond to external stakeholder needs as quickly and effectively as possible. Currently, HEIs hold a view that their level of autonomy and associated flexibility could be enhanced. As such, it is recommended to organise, as soon as possible, a collective engagement between government agencies and HEIs with a view to identifying and agreeing ways to remove potential barriers to greater autonomy and improved flexibility within the boundaries of existing legislative and governance requirements.

At a regional level, groups comprising representatives from local government, HEIs, industry and business should also be established with a view to developing and implementing third mission strategies focused on economic development activities. Given their considerable potential and broad capabilities, consideration should be given to allowing universities to lead regional development activities, particularly in areas outside of Budapest which currently lack regional development fora. Examples of stakeholder involvement in the strategic planning and implementation can be found in the Action Plan for Jobs and the Regional Skills Fora in Ireland (Box 3.5). The advantages of applying the above learning models in Hungary include ensuring stakeholder participation in the development of national and regional strategies, the setting of goals on a collective basis, and participation by stakeholders in the delivery and monitoring of progress, thus promoting a partnership approach to national and regional development agenda.

Box 3.5. **Action Plan for Jobs and Regional Skills Fora in Ireland**

Since the Action Plan for Jobs was introduced in 2012, it has been one of the Irish Government's key instruments to support job creation. The Action Plan for Jobs is a whole-of-Government initiative under which all Government Departments and Agencies work together to deliver on the agreed action points for each year. An Action Plan for Jobs is published every year, setting out clear actions and targets to help create positive conditions for job creation. Results are reviewed quarterly and progress reports are published.

National and Regional Actions Plans for jobs have been developed under the direction of the Department of Jobs, Enterprise and Innovation. At a national level, an implementation success rate of over 90% has been achieved and this performance has been seen as instrumental in: exports reaching record levels, the creation of 80 000 additional new jobs, and significantly improving Ireland's competitiveness.

Key to the success of the National Plan is the implementation of Regional Action Plans, which sees stakeholders in the regions coming together to agree and implement activities which are identified as key to driving improved economic performance in their respective regions. Stakeholders include: national agencies, including Enterprise Ireland and the Industrial Development Agency; local government agencies; education providers, both further and higher education; and industry and business representatives. Progress in relation to achieving stated targets and objectives is reported on a quarterly basis by the appropriate stakeholder(s). Review meetings are also held on a quarterly basis, with all stakeholders, with a view to updating or adapting plans depending on developments and progress to-date.

The Network of Regional Skills Fora, which has recently been created as part of the Irish Government's National Skills Strategy, provides an opportunity for employers and the

Box 3.5. **Action Plan for Jobs and Regional Skills Fora in Ireland** *(cont.)*

education and training system to work together to meet the emerging skills needs of their regions. More structured engagement on the skills agenda and the work of the Fora will contribute to better outcomes for learners and support enterprise development. The Fora provides:

- A single contact point in each region to help employers connect with the range of services and supports available across the education and training system.
- More robust labour market information and analysis of employer needs to inform programme development.
- Greater collaboration and utilisation of resources across the education and training system and enhancement of progression routes for learners.
- A structure for employers to become more involved in promoting employment roles and opportunities for career progression in their sectors.

Source: OECD/EC (2017a).

Financial considerations

Showing commitment in terms of financial investment is a key first step in terms of motivating participation in the third mission agenda. The current lack of reference to the third mission within core funding models at the national and the institutional levels regrettably contributes to the impression that the third mission is of lesser importance in comparison to teaching and learning or research activities. The relative amount of investment in comparison to the other mission pillars is not critical. In fact, it would be recommended not to take a "big bang approach", but rather a more cautious sequential step approach in terms of investing in the third mission in comparison to other areas, so as not to create any unnecessary shocks to an already fragile financial system.

Third mission activities will not be sustainable without initial, and indeed continued, investment from core funding. Any thoughts that funding generated from third mission activities will be sufficient to sustain them going forward would be unfounded. Certain third mission organisational and structural arrangements should always be supported by core funding given the considerable financial fluctuations that can occur in revenue generation associated with external third mission activities.

In relation to revenue generated from third mission activities, it is recommended that the current common practice of using these to shore up existing financial deficits should cease and be replaced by a strategy which enables strategic reserves to be created from income generation activities, which can then be deployed to support the development of strategic third mission initiatives. In other jurisdictions, it is quite common practice to have strategic reserves ring-fenced for the purpose of investment in either capital infrastructure projects or strategic development initiatives. This approach needs to be encouraged and facilitated by public policy intervention, as part of the engagement process with HEIs regarding their budgetary position, and by senior management, as part of the HEIs' strategic planning processes.

Current state investment in third mission activities is to be applauded given the prevailing fragile economic position. However, it is recommended to review the distribution of funding with a view to increasing the proportion to be applied to investment

in projects as opposed to capital infrastructure. Although it is important to invest in capital infrastructure in the long term, the current priority needs to favour investment in specific third mission projects which will stimulate and enhance engagement between HEIs and external business, industry and social partners in the short to medium term. Given the recent significant decline in student numbers, it would not be unreasonable to consider refurbishing existing space which has become available to house third mission activities at a significantly lower cost than any proposed new build, thus releasing further funding for investment in collaborative projects.

Organisational support structures

Although current structures available to support the third mission, and the amount invested in them, were considered to be insufficient by stakeholders interviewed as part of this review, it is also fair to say that Hungary is at an early stage of development in terms of the financial model and organisational structures it wishes to put in place. Given this advantageous almost blank canvas position, the question arises on which organisational structure Hungarian HEIs should select to support the third mission agenda.

The current HEInnovate round of country reviews, with the participation of Bulgaria, Ireland, Poland, the Netherlands and Hungary, has had the opportunity to examine the organisational structures used to support a three-mission model in different institutional contexts. Based upon the findings to date, it would be fair to say that there is no "one-size-fits-all" solution to selecting the most appropriate organisational structure to put in place. Even in countries such as the Netherlands and Ireland, where there have been very successful approaches taken to the development and integration of third mission activities, different organisational structures and systems have been used depending on the type of HEI, the strengths available within the HEIs, their history in terms of engagement activities, and regional considerations.

Some of the more traditional research universities in the Netherlands, such as the Erasmus University of Rotterdam, established a new centralised office to co-ordinate the implementation of the valorisation programme across all faculties, whereas the more recently established universities, such as Twente, utilise an enhanced version of their existing research development and innovation infrastructure, which is dispersed across its more successful research units, to support valorisation activities. In the Universities of Applied Sciences, so-called Knowledge Centres have been established with a cross-faculty remit for innovation and entrepreneurship OECD/EC (2017b).

In Ireland, the engagement agenda within the universities resides under the control of the office of the Dean of Research, Development and Innovation and its support offices provide assistance to the faculties. Teaching and learning activities associated with external engagement, such as industry training programmes and work based learning, are usually organised through the faculties themselves. The situation differs for the Institutes of Technology, where the office of the Head of Development has overall responsibility for all external engagement activities, including research development and innovation, as well as any relevant third mission teaching and learning initiatives. This is likely to change in the coming years as the volume of external engagement activities increases OECD/EC (2017a).

From a Hungarian perspective, it is important to understand that the HEIs observed as part of this country review appeared to be very much at a developmental stage in terms of embedding third mission activities and as a result, the following actions are recommended

in terms of the development of an organisational structure to support the third mission within HEIs.

Firstly, the temptation naturally exists for third mission activities to be given either as an additional task to an existing manager or spread across the workload of a number of existing managers, given the current volume of activity in the area in comparison to other jurisdictions. This approach should be avoided given the future importance being attached to third mission activities by both government and HEIs. It is recommended, in the short to medium term, that responsibility for management of the overall third mission agenda needs to reside with one senior manager, whose role is this and only this and who is given the appropriate authority and resources to deliver on the agenda.

In terms of the support structure and support offices to be put in place, individual HEIs should be allowed to have the autonomy and flexibility to develop the most appropriate system for them as per the experience in other countries. The imposition of a common support structure across all HEIs should be avoided and instead, individual HEIs should be allowed to make applications for resources based on an institute specific plan which takes into account the type of institution, its history of engagement, its relative strengths, and other local and regional considerations. Having said this, the HEInnovate framework, with its 37 statements, provides excellent guidance on how to establish support structures, processes and procedures.

Finally, in relation to organisational structures within individual HEIs, all HEIs should be encouraged and supported in exploring and understanding existing successful models in other jurisdictions with a view to identifying and creating an international network of collaborative mentor and partner institutes who could advise and assist in the development and embedding of the third mission agenda.

National support structure

From a national perspective, much has been done in terms of the development of strategic plans related to third mission activities in the higher education sector by relevant ministries. However, the availability of data and analysis which both underpin and monitor progress in relation to the implementation of these strategies is lacking. It is therefore recommended that further development and integration of various data systems and subsequent capacity for analysis is developed. To this end, it may be necessary to expand or establish new government based units or agencies within appropriate ministries who are tasked with identifying, monitoring and analysing data and information relevant to higher third mission activities which can be used to provide updates and reports to inform progress and contribute to planning any future strategic direction for this vital mission area. An example of such an agency and potential learning model observed as part of the HEInnovate review in Ireland is the Expert Group on Future Skills Needs (Box 3.6).

In the implementation of the HEI strategic plans, the Ministry of Human Capacities could consider agreeing performance compacts with each HEI which contain specific metrics and targets the HEI should meet and which are relevant to the delivery of regional and national third mission targets and objectives. Following on from and allied to this approach could be the development of a national impact assessment model, which would provide not only important quantitative data but equally important qualitative data to better inform future higher education policy and also provide tangible evidence in support of increased investment in higher education. The creation of an impact assessment model

Box 3.6. **Expert Group on Future Skills Needs (Ireland)**

The Expert Group on Future Skills Needs (EGFSN) advises the Irish Government on the current and future skills needs of the economy and on other labour market issues that impact on Ireland's enterprise and employment growth. It has a central role in ensuring that labour market needs for skilled workers are anticipated and met. Established in 1997, the EGFSN reports to the Minister for Jobs, Enterprise and Innovation and the Minister for Education and Skills.

The Department of Jobs, Enterprise and Innovation, in conjunction with SOLAS the state training agency, provides the EGFSN with research and secretariat support. The SOLAS Skills and Labour Market Research Unit provides the Group with data, analysis and research and manages the National Skills Database. The Department of Jobs, Enterprise and Innovation provides the Group with research and secretariat support. The Group's work programme is managed by the Head of Secretariat based in the Department of Jobs, Enterprise and Innovation. The EGFSN's budget comes from the National Training Fund.

The Expert Group on Future Skills Needs provides advice to Government on skills issues impacting enterprise through:

- Skills foresight & benchmarking
- Strategic advice on building skills through education and training
- Data collection and analysis on demand and supply of skilled labour
- Influencing and monitoring implementation

Source: Expert Group on Future Skills Needs (2017).

should be seen as a medium-term objective given that other countries who have had performance compacts in place over the last three to five years are only now in a position to consider developing an appropriate impact assessment model.

The creation of HEI clusters in specific disciplines, with a focus on third mission activities with industry, business and the international community, should be encouraged, promoted and facilitated by government agencies in order to enhance national capabilities and maximise opportunities. In this regard, the competition culture which currently exists among HEIs in disciplines where Hungary has a recognised international reputation needs to be addressed, particularly when good practice examples of HEI cluster activities are now emerging both within and outside the EU.

Participation of staff

Key to the implementation of successful third mission strategies is the availability and participation of appropriate staff, be they academic, technical or administrative, in the delivery of the third mission agenda. As previously outlined, the vast majority of staff in HEIs operate in a dual-mission model where their contracts of employment and workloads are oriented towards teaching and research activities only. Given existing busy workloads and the lack of any significant staff incentive schemes to facilitate participation in the third mission, it is understandable that there has been little traction in the expansion of this mission agenda among all staff groups in recent years, with the exception of the development of associated strategies by senior management teams.

Going forward, it will be essential to consider the following:

- Renegotiate existing staff contracts where there is a desire to do so, with a view to balancing staff activities across the three mission areas. This will most likely require an incentivisation approach whereby teaching and research activities will need to be reduced in order to facilitate the introduction of additional third mission activities. This will not be an easy task to achieve given existing financial constraints, current teaching and research commitments, and other historical considerations.
- Create and roll out different contracts of employment for any new staff to be employed by the HEIs which will allow for participation in third mission activities and provide future flexibility in terms of the ability of the HEIs to increase or decrease individual staff deployment across all three mission areas.
- Make professional development programmes available to all staff, which focus on improving the understanding of the third mission agenda, as well as improving the skills base available to deliver on this agenda.
- Invest in staff mobility programmes for the purpose of gaining further knowledge and insight into business, industry and community requirements, as well as international partner HEIs' expertise. This will be an essential component of any professional development programme.
- Invest in incentive and recognition schemes. Similar to competitive research funding calls, the introduction of competitive calls within HEIs to fund third mission project proposals linked to education and research activities would clearly incentivise and promote the third mission agenda.
- Give greater recognition to staff participation and performance in third mission activities through promotional opportunities (e.g. professorship in entrepreneurship or innovation), staff performance management and development systems, and staff awards schemes (e.g. President's award for innovation or community engagement).

Increasing the available learning opportunities for students

A final recommendation for consideration which would benefit the most important stakeholders, the student body, would be to consider increasing the available learning opportunities for students through the introduction of a multi-step ladder system of qualifications at undergraduate level as exists, for example, within the Dutch, Portuguese and Irish national frameworks of qualifications. In common with other jurisdictions, the Hungarian framework of qualifications allows students to obtain a Bachelor degree, however there is no facility in place to allow students to step in and out of undergraduate education that could be facilitated by the availability of a multi-level undergraduate system incorporating ordinary and/or associate degrees which exist in other jurisdictions. Such an approach could also improve retention and progression rates within the HE system by allowing students to obtain a full qualification at an earlier stage within the undergraduate cycle.

The advantages of having such a multi-level system include:

- Students could decide how they would progress with their undergraduate studies in terms of the level they would enter and exit.
- The ability of students to enter and exit at different levels would offer students the opportunity to gain exposure to industry and business both at home or abroad and return to their studies at a later stage.

- Facilitating student exposure to different types of undergraduate programmes, which in other jurisdictions incorporate significant exposure to real world, work place and third mission activities which are not available in traditional bachelor degree programmes.

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Chapter 4

Enhancing knowledge exchange and collaboration in Hungarian higher education institutions

This chapter expands on the findings presented in Chapter 2 related to knowledge exchange and collaboration. It provides an in-depth discussion of the challenges and opportunities and suggests that higher education institutions (HEIs) should not shy away from becoming "pioneers" in the sense that they actively promote and reward entrepreneurship, innovation and the third mission by aligning strategy with operational day-to-day practice. Students, researchers, administrative staff, academics and the HEI leadership, as well as the general public, lend increasing support to the HEI's role in enhancing knowledge exchange with a general trend towards the Knowledge Society. The chapter explores current strategies and practices to organise knowledge exchange across the HEI and provides learning models on effective support structures.

Introduction

The modern higher education institution (HEI) is an organisation in transition. The traditional roles of research and teaching are increasingly complemented by the ability to transfer knowledge and technology into other realms, where it will benefit industry, politics and wider society. The third mission, as this new task of HEIs is referred to, paves the way for HEIs to assume a more active role as innovators on a regional, national or even a global scale. The new mission does exhibit opportunities for closer co-operation with external stakeholders, provides new sources of knowledge (possibly also financing) and helps HEIs to get rid of the myth of "ivory towers" once and for all. Notwithstanding the potential benefits, there are also challenges for the organisational routines of HEIs which are mostly adapted for delivering research results and educating students.

With the progression through the Knowledge Era, society faces more complex challenges that often demand a combination of knowledge or technology spread across different fields. Complexity of "real world" problems mirrors an increased complexity in research projects, many of which (both basic and applied) have become transdisciplinary in nature. At the same time, knowledge production has become an extremely specialised task. Whereas in times of Leibniz[1] (1646-1716) it was still possible to unify the most essential knowledge of the time in one individual, rapid accumulation of knowledge and scientific progress have led to a fragmentation in terms of individuals that possess certain expertise in a scientific field. The result is a distribution of knowledge within HEIs over several hundred (if not thousands of) individuals that are all experts in a very narrowly defined area.

In addition to the fragmentation in scientific knowledge, science has seen fundamental changes in how financial resources are allocated. Elements of competition for funding have been introduced to a substantial degree into research funding schemes to increase efficiency and reduce costs. In order to successfully compete against others, researchers need information on funding opportunities and specific skills to apply for a grant. Activities that would be referred to as "in-house consulting" or "internal services" in a business context have increased in HEIs. This has resulted in a further division of labour between "scientists" and "university professionals". The internal state of the modern HEI thus is such that scientific knowledge is dispersed and procedural knowledge is decoupled from the scientist. Consequently, the efficiency of an HEI in solving complex and meaningful problems and successfully competing for resources depends upon how fast and easy knowledge flows are organised inside and across institutional borders.

At the same time, pressure on HEIs has increased to "produce something useful" and to help diffuse research results to the general public. More and more emphasis is thus on projects with translational character including direct involvement of firm research and development (R&D) in the very early stages of the research process. These developments regarding the nature and kind of research projects affect several dimensions such as the composition of research partnerships, prerequisites for external funding and expected results.

The third mission (and subsequent developments) emphasise the role of HEIs in shaping societies or, at least, in expanding its role in society beyond the traditional activities of education and research. For this, HEIs need to know what is going on in their environment. Especially in regions where HEIs also constitute a major economic force (as an employer and a demand factor), assuming an active role among regional stakeholders is in the HEIs' own interest, but requires organisational capabilities that have previously not played a major role.

Transdisciplinarity and translationality closely correspond to the needs of internal and external knowledge exchange. Whereas internal exchange in HEIs helps to ease frictions in bringing together different disciplines – and along with it different theories, methods and traditions – exchange with externals becomes increasingly important, too. This requires researchers to be informed about collaboration opportunities and supported in the management of joint projects. In order to prevent fragmentation and simultaneously comply with the expectations of the third mission, a sufficient level of knowledge sharing and exchange is needed. Ideally, the modern HEI possesses (or builds) the capacity for conducting a professional knowledge management.

Knowledge exchange (especially with the environment) is not an entirely new phenomenon and has always taken place at HEIs. Bits of information are continuously exchanged by people at their workplace and beyond. However, increased complexity, fluctuations of personnel and amount of information, as well as speed of information flows, call for co-ordination ("knowledge management") at least to some extent to arrive at meaningful exchanges conveying true "knowledge" and not purely "information".

Engaging with others in any organisation is often complicated by interfacing problems. Especially with external partners that originate in other realms, different organisational logics complicate communication and call for a mediator. This can be an experienced technology transfer office (TTO) or, on a more abstract level, a set of institutional arrangements like industry-sponsored labs, professorships held by industry professionals or the opening of HEI facilities for public exhibitions that incentivise knowledge sharing and facilitate knowledge flows.

Turning uncoordinated and random encounters between HEI members and the "outside" into continuous, directed and mutual beneficial exchanges, which result in institutional impact going beyond the level of individuals involved is one of the main challenges for HEIs. This does not mean that uncoordinated knowledge exchange is undesirable or useless. Granovetter (1973) emphasised the relevance of (informal) "weak ties" in knowledge flows as being more flexible and faster than (institutionalised) "strong ties". Trust is often mutually established through personal contacts and acts as a major facilitator of knowledge flows.

The emphasis on formal knowledge exchange institutions in this (and many other) recommendations is an attempt to provide a framework for regular and co-ordinated knowledge flows that are sustainable and efficient in the long-run and on an organisational level. Informal contacts, mutual trust and even mutual "liking" among different parties will, without doubt, still play a role in the extent to which knowledge is exchanged and the success of co-ordination attempts as a result.

Analysis and findings

The following discussion of findings from the review of current knowledge exchange strategies and practices in five HEIs in Hungary should be considered with caution, because not all of them may be applicable to all sorts of HEIs in general and to the Hungarian ones in particular.

- The visited HEIs differ in their structure and focus of academic disciplines. Some are fully-fledged "universities" with every scientific field covered, others are more specialised in their areas of education and research. This is likely to have an effect, for example, on the need for cross-disciplinary exchange, which will be less of a problem in "focused" universities, where knowledge base, common research and teaching traditions can be expected to be more similar.
- HEIs differ in their age and reputation in the country. Some are considered "national heritages" by their peers, whereas others have assumed university status more recently. This is likely to influence access to resources and political support through reputation effects and/or strategic considerations.
- Some HEIs were in a restructuring process with significant organisational stress surfacing throughout the visits. For those HEIs it may be detrimental to introduce new initiatives before restructuring is completed, as it is likely to have adverse effects through increasing pressure even further. Any efforts to pursue activities along a third mission agenda should be at least thoroughly co-ordinated with any ongoing projects for integration of departments at the HEIs in question. Furthermore, it is highly likely that those HEIs will prioritise restructuring and may have neither the financial resources, nor the time to pursue an elaborate third mission development plan.
- Some HEIs are regionally concentrated, whereas others have up to 100km distance between their campuses (partly because of the aforementioned restructuring). Although positive effects in terms of the ability to tap into different regional configurations may exist, it is likely that the dispersed HEIs will have difficulty in maintaining a cohesive organisational culture and strategy. In the best case, a federation-like model of departments may emerge that benefits from a variety of knowledge bases and experience. In less desirable scenarios, the HEI leadership is unable to find a good balance between organisational freedom and central co-ordination, which creates barriers that reduce collaboration between different departments.
- The environments of HEIs are different. Those in or close to Budapest are nearer to the "national central hub" and may benefit from proximity to policy makers, larger co-operation partners or infrastructure to name but a few. On the other hand, more constraints may exist as regards external financing (e.g. for the EU structural funds), because Budapest is not as much a "developing region" as many other Hungarian districts. Conversely, HEIs in these "outer regions" may have a less vibrant/dynamic environment, but perhaps a better access to financing.

Positive attitude and general commitment towards knowledge exchange

The HEIs visited demonstrated a strong commitment to knowledge exchange, at least at the highest level of leadership. Several promising activities are underway (or already finished). Public authorities put more and more emphasis on the impact of scientific knowledge generated in HEIs, urging them to engage with (local) industry and community organisations if they apply for funding. Building bonds with local firms and devising strategies for research

orientations that take the regional environment into account should thus also enhance future prospects of successfully securing funding from national and supra-national sources.

The HEIs should not shy away from becoming "pioneers" in the sense that they actively promote and reward third mission activities aligning strategic mission statements with operational day-to-day practice. Individuals (students, researchers, higher education professionals, etc.) as well as the general public (government, tax payers, etc.) lend increasing support to third mission and with a general trend towards the Knowledge Society, this is likely to further increase in the future. In particular,, HEIs that face challenges in the other two missions – for example, because they are less reputed, smaller and/or younger or located in more remote areas – should embrace the new mission, even if it is still evolving and entails uncertainty as to what kind of activities it actually encompasses. Admittedly, changing attitudes and directions at HEIs takes time and resources. However, in the end, it is supposed to be "the" third mission of HEIs, not "a" third mission. Accordingly, required changes are of fundamental nature.

Knowledge exchange and collaboration, or the third mission, is a comparatively new expectation by society that HEIs have, however, always engaged in, albeit not in a structured way. Third mission activities, if taken seriously, should be on par and in synergy with the traditional missions of HEIs, which are education and research. The difficulty of prioritisation arises, because the latter two are well established and proven indicators exist to measure their effectiveness. All strategies and mission statements include mentioning of various forms of knowledge exchange and collaboration. This, and the reference to the third mission in the country's new higher education strategy, confirms the importance of the issue to all stakeholders. However, the understanding of knowledge exchange was limited to technology transfer activities in general, and research spin-off companies in particular. Largely missing was the wider notion of knowledge exchange activities as engagement with business and industry, the community, public policy, other education providers, as well as activities related to the artistic, cultural and sporting life of the local economy.

Some of the HEIs (or parts thereof) have been subject to frequent restructuring. Without doubt, the rationale behind this poses at least as many threats as opportunities. Opportunities may consist in the possibility to incorporate new, previously not available knowledge and competencies into the HEI. However, the visited HEIs seemed to be under severe stress and the "new" departments did not seem to primarily consider the restructuring to be an opportunity. Together with the rather high level of distrust (see below) there is a risk that the newly incorporated parts remain isolated. This may result in disconnected knowledge bases with a lot of potential unlikely to be activated. There are cases where parts of the same HEI are now located across a radius of several hundred kilometres, which makes it even harder to connect knowledge bases and establish a common institutionalised knowledge exchange framework, both inside and outside the HEI.

The visited HEIs have shown resilience and openness to experimentation, however, the enthusiasm at top-leadership level has not yet diffused through all parts of the HEIs. Some interviewees expressed their worries that many new ideas are coming "from above" without the necessary support. Researchers seem to be confused and overwhelmed on what to prioritise once confronted with leadership expectations to get more involved in knowledge exchange activities. A well-communicated strategy, which explains objectives, activities and resources of the third mission helps to legitimise the "new" role of the organisation both externally and within the HEI.

Promising examples of knowledge exchange activities with external stakeholders

All the visited HEIs are responding to an increasing pressure from society to interact with external stakeholders and assume a more proactive role in local and regional development. This results in a range of activities pertaining to internal structure and specialisation in academic disciplines, as well as institutional self-consciousness and characteristics of the surrounding economy. A surprising range of activities has crystallised to be successful at different HEIs. This emphasises the illusion of "one true" model of the third mission and the need to adapt to existent structures, resources and environments. It also indicates that there is room for mutual beneficial exchange of what the third mission entails and how it can be organised across different HEIs.

Local governments are key partners of HEIs. Naturally, co-operation is stronger in smaller cities and more rural areas where public authorities constitute a comparatively stronger stakeholder and HEIs a comparatively larger employer. Experience from other jurisdictions also indicates that in less centrally located regions, where there is only one (larger) HEI, co-ordination with local authorities is often easier (though less professional), because HEIs do not have to compete against each other for attention (and public resources).

The HEIs recognise that their role in a region is closely connected to the existing environment and its stage of development. Regional proximity also very often facilitates knowledge flows, especially if large components of it are tacit. Furthermore, it helps to build trust and increases the likelihood of forming of "weak ties". Regional firms are also more likely to face similar challenges to HEIs, especially if regional development is less dynamic. As a result, flexibility was evident in the kind of structures and support measures to be set up for knowledge exchange and technology transfer. Sometimes, experimentation had led to unique organisational solutions. In other examples, strong regional industries have become the priority target of the HEI. Consequently, third mission activities of HEIs often mirror the capacities in the region for external and research co-operation. Adaptation has often led to a focus industry (or several industries) as well.

Co-operation and exchange with local firms range from research projects on various scales to external financing of whole departments. The Széchenyi István University is fortunate to have, with Audi Hungaria, a strong regional partner with a factory employing a significant proportion of the local workforce and sponsoring an entire faculty specialising in automobile engineering. The relationship between Audi Hungaria and the university is sustained by a number of institutional arrangements. A dedicated contact person in Audi Hungaria co-ordinates the relationship. Firm employees are members of placement commissions for professorships and frequent exchanges at the researcher level enrich research activities on both sides. All of these are regulated by a formal co-operation agreement, but significant exchange is also happening on a much more informal basis, for example in the form of factory visits, joint coffee & chat sessions etc. Exchange and formal co-operation also exist in teaching. Whether it is by "invitation" of the university or through Audi's own commitment, the mutual knowledge exchange seems to also work well beyond the automobile engineering faculty. However, a word of caution is needed: a narrow focus on one strong partner may be damaging in the long-run and leave smaller opportunities untapped. For the moment, however, Széchenyi István University seems to have found a good balance between courting the firm's engagement and developing other areas with regard to the third mission.

The Eszterházy Károly University of Applied Sciences has established co-operation with the local dairy industry, albeit small and not particularly long-lasting. This also includes a new research laboratory that was partly financed by the EU. Researchers consider the co-operation a success in so far as a viable platform for collaboration has been developed. Still, they pointed out that further co-operation may be complicated by capacity issues on the side of the firms and different "passages of time" in the university and the local producers. Moreover, discussions revealed that the collaboration more or less ends on the university side when a new product is created, whereas for the firm side further resources would have to be devoted to development and marketing, and future collaboration may depend on whether the new product actually brings a return on the market.

The collaboration portfolio with industry on education activities is growing. It spans from short-term internships to fully-fledged dual education programmes (read more on this in Chapter 1). Particularly in certain disciplines, students are benefitting from the possibility to work with top-tier equipment, which was partly sponsored by firms. The ground gained with respect to co-operation in education is, however, overshadowed by the fear of HEIs to lose too many students to firms once they have entered an internship and encounter with modern work environments. HEIs also expressed their worry that firms often make attractive offers to students resulting in a high attrition rate after they graduate from Bachelor programmes. Many seem to even quit their undergraduate studies and start a job without having completed higher education. This is alarming because it leaves the students without a formal education, which may negatively affect their future job opportunities and the HEIs will lose out on promising future researchers if they are unable to retain enough students for academic careers.

Different measures come to mind to counter this development. First, a modular and more flexible system of entering and leaving the HEI, with the possibility to suspend studies and recognition of study credits should incentivise students to "come back" after having gained work experience (see final section in Chapter 3). Second, an even closer co-operation in education with industry may help students to see their studies through to the end. The challenge in this respect is twofold: students have to be convinced that they are actually learning something "applicable" and "useful for real-world problems" and the HEI has to provide something a firm cannot deliver through learning-on-the job. The former presupposes up-to-date equipment and a good understanding of current challenges in industry, whereas the latter demands cutting-edge teaching methods.

Dedicated dual education programmes that are already in place in several HEIs could be enlarged to provide a source of funding for those students that face difficulties financing their studies. Because these programmes are often paid by firms (at least partially), the HEI has to deliver knowledge, skills and learning experiences that cannot be attained by other means. There is room for action to introduce more dual forms of education at postgraduate levels. So far, there are only a few industrial PhDs and no dual programmes at Master level. This is surprising as several of the HEIs visited clearly have an orientation towards Science, Technology, Engineering and Mathematics (STEM). A possible explanation may be the fear of losing students or the missing regional capacity. An important opportunity for both firms and HEIs to bring in new knowledge and collaboratively engage in innovation and problem-solving is thus overlooked.

Efforts are underway to create support structures for knowledge exchange

Strategic planning for knowledge exchange is still ongoing the HEIs. Learning curves are steep and some HEIs may not have had enough time to accumulate sufficient

experience and evidence to prioritise activities and to establish an effective support framework. Academics, administrative staff and even HEI leaders seem to be sometimes unsure of how to translate strategic plans into their "daily" work and routines. Moreover, there is uncertainty among staff as to whether one is rewarded or punished for third mission activities, which are all too often perceived as add-ons requiring additional time and resources. Uncertainty on which activities to foster and which to cut is still high both at the institutional and the individual levels. All too often the attitude seems to be "me-too" or "must-have" rather than an informed motivation to enrich education and research through engagement with knowledge users.

At an individual level, a significant number of research collaborations exist both nationally and internationally. As in other countries, personal connections and inter-organisational employee mobility between HEIs play a significant role in this regard. The question is how to develop this into a framework that allows for individual links to create institutional spill-over effects, such as new knowledge exchange activities or new areas of collaboration.

Experience in organising institutional support structures for third mission activities plays a crucial role for success. Some of the HEIs have recognised the need to bring in external expertise. The University of Debrecen, for example, hired an outside professional with experience abroad as head of the TTO to help set up new activities. Although an "outsider" may face difficulties in engaging with researchers and external stakeholders at first (because of being from "elsewhere"), s/he may be in a better position to implement necessary changes without having to pay attention to personal contacts or institutional short-cuts that may have built up over time and that will always bias an individual who has been part of the HEI for a long(er) time. Additionally, s/he may act as a figure of authority with respect to perceived expertise.

Hiring new and competent personnel for the third mission should enhance the ability of HEIs to introduce changes. However, with quite some variation in how much freedom and command over resources the newly appointed person has, legitimacy of his/her position may be comparatively weak. Even more so, because it will take an outsider some time to get acquainted with the existing organisational structure and its underlying institutional roots and routines, and find the key people in the HEI who may act as "door-openers". It is worth a thought to team the "new" employee with a highly reputed academic, who enjoys the trust of leadership (perhaps even a retired professor) and who can simultaneously act as a conduit to reach out to HEI staff and current/past HEI partners. Otherwise, many opportunities will be forfeited simply because researchers and the TTO do not want to speak to each other or are not able to understand each other, because they do not speak the same language.

New communication tools for knowledge exchange

HEIs and their external stakeholders, especially from industry, often have different institutional logics. These result in differences in structural set-up (for example the departments or sub-units to be expected) but also determine the speed and direction of knowledge flows. For a potential partner coming from the respective other realm it is often difficult to understand how the HEI works. This can create barriers to finding the right partner to help solve a problem, and posing questions to the right department or person.

A possible way to ease this problem is to set up "one-stop-entry-points" that reduce the time it takes for externals to get fully acquainted with the HEI's institutional logic.

Similar to other services (e.g. student counselling), a potential partner approaches a central authority, whose task it is to re-distribute a request to partners within the HEI. Thus, the responsibility of finding the right person to speak to is shifted from potential partners to a person or office in the HEI that is informed about both the competencies of staff and the peculiarities of the HEI's institutional logic.

With a growing number of knowledge exchange activities, this should not only work for outside stakeholders but become an entry point for "insiders" as well. Very often, a complex third mission portfolio branches out at some point into different activities, for example, licensing, start-up support, innovation consultancies, etc. Various support schemes, external partners, or sometimes just "divisional thinking" may result in different departments of the HEI practising some of these activities without other departments being aware of them. At this point it might be difficult for internals, e.g. researchers, to find the right contact person. A "one-stop-entry-point" should then be turned into a platform that serves both internal and external stakeholders. In all of the visited HEIs such "one-stop-entry-points" exist; and at least one staff member had been appointed as responsible for communication with the outside environment. A common practice is to put a technology transfer officer in charge, who reports directly to the HEI's top-leadership.

A "one-stop-entry-point" is often organised through an online contact or ticket system, where requests are collected and then referred to the relevant units or individual staff members. The Szent István University recently introduced such a system and designed knowledge sharing tools targeted at different audiences. These included research catalogues and a "knowledge map" for better advertising of the HEI's research topics and competencies to external stakeholders.

Professional knowledge sharing tools become important once an institution reaches a size which makes it impossible to only rely on face-to-face communication. They allow for easy access from different parties and act as a long-time archive with the option of analysing knowledge flows for process optimisation purposes. Crucial points for any such tool are its ease-of-use, presentation and structuring of information, and regular input from its users. Often, a platform, map or sharing tool is introduced with great effort, but stays dormant thereafter, because users find it too cumbersome to utilise.

A knowledge map may aid in this endeavour as it visualises competencies and can act a decision support tool. Furthermore, it may also help to display proficiency/competencies/fields of knowledge to external stakeholders and parties potentially interested in co-operation. Besides their function as a display to the "outside", knowledge maps can also act as a strategic planning instrument for HEIs' leadership, because they highlight competitive advantages and weaknesses. A regularly updated map can provide information on what opportunities to pursue with the combination of knowledge at hand and which to let pass, because resources would be mobilised in vain.

Although there is a degree of path-dependency when setting-up support structures for knowledge exchange, and some decisions may prove irreversible in the short-run, this flexibility is something to treasure in future developments. Experience of the Silicon Valley in California and attempts to recreate its success in other regions "out of thin air" have shown that there is no one-size-fits-all solution to the challenges faced by modern-day HEIs. Organisations are well-advised to take into account un- or underutilised resources to support experimentation (and perhaps failure) before finding the "right" model that fully fits their needs.

The Széchenyi István University demonstrates a noteworthy amount of flexibility and openness to trial-and-error learning with regard to the institutional set-up and the size of its TTO. At the time of the study visit there was no formal TTO but a technology transfer council as a more formal approach "just did not seem to work". This adoption to idiosyncratic needs is much desired when setting up third mission activities. Empirical work has revealed some common factors for successful knowledge and technology transfer (e.g. size and staffing of the TTO, extent of organisational inertia, legitimacy from university leaders, etc.). These should not be taken as a blueprint. Environmental conditions play a huge role for success and activities should be carefully adopted in size and scope. Taking a step back is sometimes an option if initiatives do not yield the desired outcome. Future expansion possibilities notwithstanding, finding a working model and having confidence in it may be a success factor for HEIs. The current model also seems to require slightly less resources and causes less co-ordination work. Furthermore, the university also has an intermediary organisation, Universitas, that acts as a complement to the technology transfer council and a separate legal entity. The ability to bundle knowledge from across the all faculties makes the university an attractive partner as whole portfolios can be offered instead of single technologies. A challenge seems to be that as an independent legal entity Universitas is not entitled to act as an official representation of Széchenyi István University, which is often desirable for means of reputation and legitimacy (see Chapter 2).

Not enough connections with linking institutions and incubators

A constant dialogue is needed to tailor knowledge and technologies to the needs of firms, which often work along lines of cost-benefit, potential demand and product-portfolio effects. In the case of the visited HEIs, partner SMEs often lack resources and capacity to engage in large-scale projects. And even if local firms are not missing capacities (see below), they need to realise that HEIs are the right partner for their innovation activities. For this, the HEIs need to understand the institutional logic of their partner firms; simply "presenting" results and hoping for application/commercialisation is not enough. Research projects earning recognition for HEIs' researchers may have no apparent value for firms. Very often, however, results have the potential to improve firms' operations if their criteria for success are taken into account early on. Sometimes, a little more effort in development may be needed, which calls for reserving (or redistributing) a certain amount of (financial) resources after a research project is finished.

Even with mutual knowledge about the partners' institutional logic and modes of operation, the gap between HEIs and firms, but also society at large, is often too wide to be bridged without a linking institution or a mediator. Although not always initiated by the HEIs themselves, the possibilities of (brokered) contact with industry and society increase, and the intensity of exchange is likely to grow in the future. HEIs also show increasing interest and build up their own science centres to attract incubators to their respective locations. Initiatives by HEIs come at a time when public and governmental support is on the rise, both nationally and internationally (especially support from the EU). The environment for setting up and attracting linking institutions is therefore especially favourable at present.

Contact with mediator institutions depends heavily on geographic and knowledge proximity, that is, whether these are present in the regional environment and match with the discipline portfolio of the HEI and its third mission agenda. In other words, contact depends on factors not always to be influenced by HEIs.

The visited HEIs showed only a few connections to incubators. One reason could be that they do not exist in a sufficient number outside of Budapest (yet) and HEIs themselves do not have enough resources to establish them. If they have resources, a slight tendency to focus on physical infrastructure (perhaps as a result of public support schemes) rather than on institutions, structures and going concerns was evident (see Chapter 5).

Dominance of personal contacts in knowledge exchange

Procedures exist in all visited HEIs to enhance a formalised knowledge exchange that is not bound to single individuals, who would create a "gap" if ever they left the HEI. However, the majority of knowledge flows is still through personal contacts. This is true for both the inside and the outside dimension. This is not to say that personal contacts are bad. As mentioned earlier, knowledge exchange through personal contact is one of the oldest forms of interaction with the (industrial) environment for HEIs. "Weak ties" are essential facilitators of knowledge diffusion. Additionally, scientists may prefer personal contact, because, once established, it is a faster and less bureaucratic way of interacting with the outside environment.

However, in most HEIs knowledge sharing is still not seen as an activity, but rather something that "happens alongside" other activities, and professional knowledge management is missing or in a very early phase. The potential damage to the HEI is severe.

- First, connections to long-lasting partners are often lost if they existed only on a personal basis. This constellation is especially unfortunate, because the HEI can influence only one side (that is, its own) whereas the connection may be lost if the interlocutor on the other side leaves. Empirical evidence also shows that individuals often carry their personal network with them as they leave (in fact they may have been hired because of their network). If knowledge exchange is largely based on personal contacts, it is quite possible that a departing employee will also take with them the co-operation partner.
- Second, the HEI has less control over what is actually arranged in collaborations, which has multiple issues. On the one hand, scientists may simply have no idea about what is common "on the market" and sell their services significantly below value. On the other hand, what is a good deal for an individual may simply not be as good for the HEI as a whole. Further problems are a lack of quality control and possible damage to reputation if the delivery was not satisfactory.
- Third, the HEI forgoes information possibilities on industry trends and may possess competencies that it is not aware of, because both information and competencies are not publicly revealed or honoured. A good example in this regard is grant writing experience that would often benefit a number of individuals but tends to be scattered across a few highly active researchers, unless a central service exists that collects information and assists individual researchers in formulating their grants.

To sum up, for fast and efficient knowledge flows, resources have to be allocated for the establishment of an effective knowledge management system, with an observatory of relevant industries, support tools and ways to institutionalise individual contacts.

Incentivising knowledge exchange

Incentives can help to align the individual motivations of employees with the (knowledge exchange) aim of the organisation. The range of possibilities in this regard is long, and spans from purely symbolic recognition, to changes in the job description, to financial rewards. The conclusion from the study visits and the interviews is that the

institutional culture is not very outward looking and conducive to knowledge exchange. A striking commonality is the distrust that people have in sharing information through institutional channels. Knowledge exchange seems to work almost exclusively through personal contacts. Incentives for exchange or collective "burden sharing" are virtually non-existent. Vital competencies are isolated and procedural knowledge (for example with regard to grant writing) is shunned by colleagues, either for fear of opportunistic exploitation or because of the lack of mechanisms for diffusion through the organisation. On the positive side, some researchers seem to utilise their freedom to voluntarily engage with industry, sometimes in a very informal way. They conveyed that these contacts are essential for their research and that they are not inhibited by the HEI, either because the HEI is not aware of the contact or it (passively) endorses the exchange.

The Eszterházy Károly University of Applied Sciences has established a quality assessment system for teachers and researchers. Even if this system may not work perfectly or does not have a direct impact on the salary of employees (like a provision system in a firm would have), the very fact of having a quality assessment says a lot on performance orientation but also on the value of transparency and willingness to engage in (friendly) competition (see Chapter 3).

A quality assessment with universal criteria ensures transparency among colleagues. Its usage also demonstrates a high level of trust between employees. Transparency and trust are highly effective facilitators of (internal) knowledge transfer. Furthermore, for outside stakeholders such a system may convey an increased level of "professionalism" and act as a positive signal of quality to be expected (for example when engaging in formal co-operation).

From an organisational side, there seemed to be too few credible incentives in place to facilitate exchange and no "punishment" for bad practices existed. Additionally, a rift between administrative personnel and scientists exists (although to some degree this is normal in HEIs). Administrative staff are sometimes perceived as not helpful and often unknowledgable (from the scientists' side). However, this is a one-sided view and the truth may be that administration is as overwhelmed with the "new" mission as scientists are. Unfortunately, distrust between scientists and administration will inhibit vertical knowledge exchange and the flow of procedural knowledge. This, in turn, may lead to a mutual blockade between academic and administrative staff.

There was a widespread fear of losing proprietorship when revealing knowledge and a common fear of others taking advantage. Co-operative behaviour seems to be frowned upon and works mainly with close partners and personal contacts. Consequences of the high level of distrust correspond closely to the ones highlighted above, but here they are particularly challenging because distrust, if rooted in personality and general behaviour, will be hard to overcome in the short to medium term. Some interviewees expressed the view that the lack of trust is a feature of the common cultural consciousness of Hungarians. As such, it would need strong individual incentives, role model setting by leadership and a lot of patience to overcome. Trust issues did not seem to be as prevalent in international co-operation, possibly because the involved individuals do not compete for the same resources and/or funding schemes at national institutions.

Unused potential in transdisciplinary research

Internal co-operation among researchers is a common feature in all the visited HEIs and good examples of transdisciplinary projects exist, also with other HEIs nationally and abroad.

Room for improvement exists with regard to possibilities to set-up interdisciplinary initiatives outside of external funding calls. HEIs could set aside some resources for fields with strategic importance and medium- to long-term relevance in society. This could also help to develop a more distinct research profile and may include external stakeholders to emphasise a transfer agenda.

There are several examples, at the visited HEIs, of research projects spanning several academic fields, thus fostering cross-disciplinary knowledge flows. These collaborations take on various forms, from externally financed projects to cross-disciplinary doctoral training schools. However, strategic initiatives for cross-departmental research are still rare. There seems to be no room for an agenda on "challenge-based" programmes (e.g. ageing society, e-mobility, climate change). Accordingly, transdisciplinary knowledge exchange (apart from the examples mentioned herein) takes place mainly only on a personal basis and in reaction to calls for application to research funds. Virtually no resources exist for "bottom-up" cross-faculty co-operation. This is unfortunate for at least three reasons.

- First, publicly available research grants move towards an emphasis on multi-disciplinary approaches. If consortia are only formed at times of opening of calls, the respective HEI may simply be too late to file for a competitive application.
- Second, as already outlined in the introduction, challenges faced by society grow in complexity and very often demand expert knowledge from different fields to arrive at an acceptable solution.
- Third, horizontal co-operation may be an opportunity for HEIs whose departments would otherwise be too small to make an impact (see below). With a focus on a few strategic areas (to be decided upon by the scientists themselves) spanning larger parts of the HEI, resources may yield synergies that were hence undiscovered. Furthermore, smaller HEIs may actually benefit from their size in this regard because a shorter personal distance in smaller organisations tends to facilitate knowledge flows and increases success of transdisciplinary endeavours.

All visited HEIs had some sort of "PhD council" supervising graduation procedures of young researchers, which offer a co-ordination mechanism for knowledge flows across departments. These councils provide a good example for institutionalised knowledge exchange in a specific area, which is neither at the "rector", nor at the "dean" level. The *raison d'être* for the councils is a task-based orientation: regulatory control on assigning PhDs and implementation of related operational frameworks. In some form or another, structures like the PhD councils will exist in most other countries as well, because it is often one of the privileges of universities to assign PhDs to individuals. Most (senior) researchers, independent of nationality or discipline, should share a common understanding of "how and why" with regard to this particular institution. It is therefore conceivable that they act as a blueprint for other knowledge exchange institutions, even if those focus on a different task. Researchers often hold academic freedom in high esteem and are often resistant to change, simply because they associate additional workload and not benefits. Although an HEI may sacrifice some efficiency, it could be worthwhile to think about designing knowledge exchange mechanisms that work along the basic principles of the ones already accepted by researchers.

Capacity issues

Some of the visited HEIs are too small (taken individually and not necessarily in all their research fields) to achieve critical mass as partners for industry. This seemed especially true for large multinational companies. Interviewees expressed a dilemma here: Local firms are often too small and lack the capacity for joint research projects, whereas larger, foreign-owned firms have the choice with whom to engage and ruthlessly execute their greater negotiation power. Additionally, those firms have standards that cannot always be met by HEIs, both in terms of quality and quantity. As a result, HEIs claimed that they are very often only a "junior" partner if they were able to persuade the larger firms to co-operate. For example, in life sciences large multi-national corporations dominate the market and the competition for research co-operation happens on a global level. Interviewees pointed out that, despite available capacity with high standards and top-tier equipment, the HEI may lose out to research universities from abroad who are better connected. Strategic alliances between HEIs and the restructuring of the higher education system can create critical mass.

HEIs often cited the lack of critical mass in their environment as an obstacle to increased knowledge exchange and collaboration. Some of the HEIs are perhaps too small and possess not enough bargaining power to approach big firms for research collaborations. A national co-operation framework initiative that "directs" firms to regions outside of Budapest and enhances collaboration between HEIs and with public research organisations could help to overcome this.

In the United States, the Association of University Transfer Managers (AUTM) is a long-standing organisation bringing together professionals from different HEIs. At the European level, ASTP-proton is perhaps the closest equivalent (with personal membership). In Germany, a national body called "Technologieallianz" is in its seed-stage. This organisation is based on institutional membership and unites TTOs from different universities and, perhaps even more important, the different non-university research organisations in Germany. A similar approach in Hungary (if not yet existing), could unite third mission professionals from the different HEIs and provide them with an opportunity to exchange knowledge on common challenges or individual solutions to the most pressing problems. Overall, specificities of the Hungarian context will be best mirrored in a Hungarian network, and knowledge flows may be increased between people that deal with similar problems in their daily work. Over time, such an institution may grow into a co-ordination platform for knowledge exchange and technology transfer in Hungary and may even act as an entry point for cross-national transfer activities in the EU. Furthermore, it should enhance possibilities for co-operation, because this allows it to tap into knowledge bases presumably different from its own. As quite diverse approaches to the third mission were encountered during the study visit, exchange should be mutually beneficial. Even if other HEIs "copied" a particular model, the harm to the individual institution should be marginal as it operates in different environments.

Pooling resources for technology transfer

Not all HEIs are "fully-fledged" universities and they may sometimes have activities in only a limited number of research fields. Others may focus more on teaching. Because individually they will be hardly able (or willing) to set up their own mediator institution (like a formal TTO), they could consider establishing a common shared-service organisation. Legal considerations aside, this institution will be able to turn knowledge and

technologies from individual HEIs into portfolios and is more likely to achieve a meaningful scale compared to sole, non-integrated activities at single HEIs.

Cambridge Enterprises in the UK and MINATEC in Grenoble (France) are examples of centralised technology transfer offices with a shared-service centre catering for several higher education institutions (HEIs). Cambridge Enterprises at the University of Cambridge (2017) and MINATEC (2017) can probably not act as blueprints for most of the Hungarian HEIs. However, the idea of centralising certain aspects of the third mission outside of the focal HEI may solve the perceived size problem reported by some interviewees. In addition, the model would provide opportunities to share resources across HEIs that might otherwise be too small to have their own TTO and offer the possibility to participate in concentrated procedural knowledge. The basic idea is to establish a (formally) independent institution that handles a number of aspects of technology transfer for its members ranging from contract management to patent portfolio assembling to responsibility as a point of "first contact" for all external stakeholders. The advantages of such a centre are its high visibility, professionalism and negotiation power. Disadvantages may come from the need to share time across different institutions, which may lead to a focus on the big partners with frequent and profitable knowledge and neglect of the smaller ones. Furthermore, because the office will by physically and institutionally separated from most of its members, a combination with Knowledge Facilitators (Box 4.3, below) will be useful to keep a constant flow of new knowledge coming in from researchers.

The third mission in its comprehensive interpretation, going beyond technology licensing and spin-offs, is still a rather recent development. This poses opportunities and threats at the same time when trying to attract qualified staff. On the up-side, challenges are still fundamental and relatively similar across countries. This makes it easy for experts to "do a good job" when changing between countries, even if some peculiarities in Hungary will of course exist. A slight lagging-behind of some Hungarian HEIs compared to pioneers in the realm of the third mission may well turn into an advantage if the HEIs are able to promote vacancies as particularly interesting job opportunities with far-reaching responsibilities and room for creativity in dynamically evolving environments. This is needed to attract individuals that are not entirely focused on income, because technology transfer experts are sought-after personnel in many countries and common salaries are likely to exceed what the individual HEI is able to provide in many cases. The alternative and/or complementary approach is to offer job vacancies with third mission objectives to researchers from within the HEI. A surprisingly large number of researchers believe that they will never reach a tenured position (especially post-doctorate researcher) but do not want to work for a company either (this may be a development that has not yet gained momentum in Hungary). Some may also be rooted in the region and do not want to comply with mobility, which a researcher's career often dictates. These make excellent candidates for scouts and facilitators, as they are also familiar with the academic structures and individual connections within the HEI.

Reluctance to technology transfer (and the third mission more broadly) often results from information deficits or time-constraints on the side of the scientist. Many discoveries do not diffuse into the commercial realm because scientists are too occupied with research, and transfer is not their foremost priority. Active scouting activities could be developed to increase the number of research results that lead to transfer and application activities. This way, the TTO gets a better understanding of the (potential) competencies and projects at hand, whereas the researcher gets assistance in the decision on where to take a project, and opportunities may open up for funding schemes previously not thought of.

Box 4.3. **Knowledge Transfer Facilitators**

Knowledge Transfer Facilitators, also "Project Scouts" or "Innovation Managers", are individuals or teams acting as mediators between scientists and technology transfer offices (TTOs). With the growth of TTOs, these often become decoupled from the scientific day-to-day work of academia. Moreover, from a scientist's perspective, administrative burdens, especially with regard to third-party funding, have increased during recent years. Therefore, encouragement to engage in third mission activities is often met with reluctance. This is particularly true if the initiative has to be from the scientist's side and TTOs are merely "sitting and waiting" or see themselves as one-directional transmitters of knowledge and technology from the HEI to outside firms (traditional role in technology transfer).

A "rift" between scientists and administrative personnel exists to some extend at almost every HEI. Scientists often perceive TTO employees as "the others" (or worse "the enemy") and may have less confidence in their ability if they are not familiar with the scientific discipline in which they seek transferable knowledge. The Knowledge Transfer Facilitator bridges this gap and acts as an in-house mediator between scientists and the "right" administrative position. Because of the familiarity with the research field, knowledge exchange should be bi-directional (the facilitator knows about the research, and the researcher knows about the transfer possibilities). Examples of this kind of active scouting model exist at many universities.

Knowledge Transfer Facilitators report to the TTO, but they do not necessarily have an office there. Their task is to actively scout for possible transfer-relevant projects on a department level (or any other suitable institutional level). It is imperative that they have some knowledge in at least one of the disciplines they are scouting in. This supports trust-building with scientists. As a direct benefit to scientists, Knowledge Transfer Facilitators help to find the right grant for a project or refer individuals to the administrative unit where help is most likely to be found. In larger HEIs, organisational structure can become quite complicated and with a lot of support schemes (e.g. third-party funding support, internationalisation, mobility, training-on-the-job, etc.) it may be difficult and too time consuming for scientists to find the right information and contacts. The same holds for the quickly increasing number of possible grant providing organisations and schemes.

Funding Knowledge Transfer Facilitators may be a challenge. For finding the best fit between projects and funding institutions, it is necessary that the Facilitator is largely independent and not bound to one specific funding scheme. A solution may be to fund Facilitators through project overheads. The drawback is that this creates incentives to focus on large projects and neglect smaller ones or those which are particularly risky.

Source: Author's own work.

Structures for transdisciplinary research

Research in certain disciplines can be very capital-intensive, requiring large and continuous investments in infrastructure. This is increasingly true for STEM-related fields. Moreover, in some industries (e.g. pharmaceuticals and biotech) the market is dominated by large multinational players and Hungary is likely Hungary is likely to be only a minor player, which is a problem shared by many countries. However excellent a single HEI may be, the scale of the challenges ahead necessitates co-operation in areas of national strategic importance to ensure optimal usage of capital-intensive equipment and enhance global visibility. Co-operation within the country, for example in the form of shared-use agreements for costly research equipment, or sharing data for scientific use, would also increase

distribution of knowledge in the long-run. The patient data base at Semmelweis University is a good starting point.

Scientific areas such as engineering, biotech, pharmaceuticals and chemistry offer inherent potential for translational research because of strong traditions in industry co-operation. It is thus quite common to have doctorate students that work on a research question that is heavily influenced by practical concerns, but may have developed into a more fundamental issue calling for basic research. All too often these students are considered "lost" to academia, because most leave for firm labs afterwards. Aiming at an increase in translational activities calls for embracing them as opportunities to exchange knowledge, keeping track of trends in industry, and building mobility schemes. The inclusion of industrial partners in PhD committees is a good way to enhance these outcomes. This may require changes to the programme accreditation requirements.

Public research grants have a greater emphasis on multi- and transdisciplinary approaches. If consortia are only formed at times of opening of calls, the respective HEI may simply be too late to file for a competitive application. Internal horizontal co-operation is an opportunity for HEIs whose departments would otherwise be too small to make an impact. A response to this is the creation of an innovation fund that offers seed financing for the start-up of a transdisciplinary research initiative, which builds on existing research capacity and knowledge exchange activities with industry and local government on a topic of local/regional relevance (e.g. ageing society, e-mobility). This creates room for increased collaboration across departments, and brings together individual knowledge links into an institutional framework. If funding is available, this could be further developed into the creation of a transdisciplinary research centre (see Box 4.1).

Box 4.1. **Enhancing structures for transdisciplinary research**

Transdisciplinary research can be encouraged through the establishment of a formal "centre", which brings together different scientists under a common research theme that is often related to a specific/global challenge and leaves room for different discipline perspectives. Centres allow for a profile-building of faculties and entire HEIs and are most effective if they are in line with the HEI's overall institutional objectives; however, room should be left for bottom-up initiatives from scientists as they are often close to the trends in their own academic field. Horizontal centres mainly facilitate internal knowledge exchange, but there is no reason why they should not also include external stakeholders, especially in more permanent forms of organisation.

The centre's structure varies, ranging from a virtual organisation to a fully-fledged institute with its own building, resources and board of directors (and supervisors). The centre is a temporary institution, which is evaluated in regular time periods (e.g. 5-7 years). A virtual centre does not need a lot of additional resources. If the centre is not working well or the research theme challenge it was dealing with is no longer of importance, it can be dismantled. Finding the most appropriate size for a centre is not an easy task. Small centres are easily established, do not require much commitment from their members but may have few additional resources and are less likely to encompass many different disciplines. Thus, they often "live on" although they do not provide any knowledge exchange or synergies at all. Large centres, on the other hand, need significant commitment and bureaucratic effort to be established and often create a gravitational force that, over time, accumulates and binds resources. They are also less likely to "die" even if general scientific (or societal) attention has long shifted to other challenges.

Box 4.1. **Enhancing structures for transdisciplinary research** *(cont.)*

An example of a more formalised approach is the International Centre for Higher Education Research (INCHER) at the University of Kassel in Germany. This is an entity acting as a separate institute within the university with its own constituting documents, own budget, administrative structures and a regular evaluation. The research focus is theme-based and researchers mainly include graduated sociologists, economists and psychologists, but also physicists and historians (University of Kassel, 2017). On a lower level, the Centre of Public and International Economics (CEPIE) at the Technical University of Dresden bundles the expertise of several economists and increases visibility to the outside (Technical University of Dresden, 2017). In contrast to INCHER, CEPIE is more an effort to structure local expertise and communicate it to the outside. The centre, as such, does not have its own budget and all members belong to individual institutes/departments of the university or local research institutes.

Source: University of Kassel (2017); Technical University of Dresden (2017).

Perceived lack of R&D capacity in local firms

Another challenge is the perceived lack of R&D capacity in local firms. This is especially true for HEIs not located in Budapest. In less developed regions, outside the Hungarian capital, multinational firms tend to have production facilities only (no R&D activities) and local SMEs are often lacking capacities for a long-standing engagement with HEIs. The visited HEIs also expressed that smaller local firms are often unwilling to co-operate, be it out of a perceived incompatibility between HEIs and industry or out of an unwillingness to grow. The problem for the automobile engineering faculty in one of the HEIs was that it had access to the local factory, but there was virtually no local research co-operation. The firm more or less acted as a sponsor and stayed in close contact with the HEI, but they did not seem to view the HEI as a dedicated research partner.

If local R&D capacity is (currently) missing, HEIs may be well-advised to think about co-operative activities that require less resources and less commitment. Of course, these will be less prestigious as well, but they could provide a seed that grows into collective R&D activities (or similar) if nourished continuously. Examples of such activities could include "Transfer Days", where local firms and HEIs showcase their research and engage in discussion on current technology trends. Furthermore, intensified co-operation in teaching is imaginable, which could include structured internships or collaborative supervision of Bachelor and Master theses.

Linking mobility with knowledge exchange

An often overlooked resource in knowledge exchange are students and employees on mobility programmes, for example working or studying abroad but also those that have changed HEIs, for example between Bachelor and Master programmes or when taking a new career step.

Students returning from abroad often have to deal with administrative burdens at their home HEI, because credits are not easily transferable. Unfortunately, the home HEI most often is not interested in the students' experience beyond that. Of course, most universities have co-ordinators for the respective exchange programmes (for example Erasmus) and these engage in exchange with partner HEIs regularly. But this exchange is

often about administrative issues and not teaching (or research) content. The student who has actually experienced how teaching (and perhaps even research) works elsewhere is seldom asked. Instead his/her exposure is treated as a personal matter. Unless HEIs also engage in collaborative teaching with partner HEIs, or the returning student takes up the initiative, the acquired information is lost for the HEI. The same is true for "incoming" students from partner HEIs.

Mobile employees on the other hand, often face difficulties becoming accustomed to the new organisation and need a lot of time to figure out how things work. By the time they are in a position to change things, contacts with the former organisation may have already been lost. Furthermore, the new employees are often confronted with resistance. Departments have a tendency to stick to the status quo, because any kind of significant change is related to heavy administrative burdens.

A similar problem also pertains to students undertaking internships. Many students are required to do an internship as part of their studies. Quite often, they are also required to write a report at the end. Although this report sometimes needs to be graded, the contained knowledge on firm practices, current challenges and technological trends is seldom exploited. Unless an individual researcher has a keen interest and approaches the student (or has contacts with the firm) asking for details of his/her practical experience, the internship and the lessons-learned are, as with the mobile students/employees, treated as a personal matter.

International students as "internationalisation links" for students and knowledge partners

Most HEIs have large numbers of international students. These can form the basis for a very diverse pool of knowledge waiting to be tapped into. Their relevance may not be restricted only to teaching, but could enrich research and entrepreneurial activities as well. Attracting foreign students is a business model based on tuition fees. Studying in Hungary is a well-known model to circumvent admission barriers (*numerus clausus*) in Germany, especially for study programmes in veterinary and human medicine. Semmelweis University seems to have perfected this model by opening up an off-campus centre in Hamburg resulting in German students not even having to leave the country if they want to study at Semmelweis.

The current situation is that international students are rather isolated; they follow a separate course programme and do not have much education-related contact with Hungarian students. The point is not to criticise the HEIs for their creativity in bringing in money (on the contrary), but to highlight the fact that this is foregoing a huge potential to let Hungarian students benefit from an international experience through education-related contact with international students. The local presence of students and academics with diverse backgrounds offers potential in at least three important ways.

- International students increase the range of knowledge at hand, which allows the HEI to pursue a wider range of questions or to look at problems from more than one perspective. International students/employees can also bridge language barriers, which would be important for international collaboration, but also the reading of texts (journal articles, laws, historical papers, etc.) previously inaccessible to the HEI.
- Diversity fosters intercultural learning experiences among both faculties and administration. With an increasing level of international exchange and globalisation of production and

research, the ability to communicate and empathise with people of different nationality, gender, religion, etc. is one of the most sought-after "soft skills" in today's job market. HEIs that can provide this skill to their students and employees will certainly benefit a lot in terms of future co-operation and attractiveness for students and staff.

- Substantial numbers of foreign students and academics call for organisational arrangements not necessarily needed in HEIs with only a few individuals from abroad. In order to become attractive for students and researchers that do not necessarily speak Hungarian, a variety of documents needs to be translated into English (or other languages) and administrative staff as well as researchers may face higher expectations with regard to foreign language proficiency. Over time, this should raise the organisational competency level, which can in turn become a source of competitive advantage, for example, for international research projects.

Integrating incoming international students, even if it is only for a limited period of time, should be a priority for HEIs. Lund University in Sweden offers relevant learning (Box 4.2).

Box 4.2. **Internationalisation at home: Lund University (Sweden)**

An example of how to make internationalisation at home work effectively is the University of Lund in Sweden. Starting with a very comprehensive (English) website, the university offers a written guide to academic life and has an impressive number of student associations, as well as sports activities and cultural events. Naturally, not all of these will be specifically aimed at international students, but great effort is undertaken to integrate those that are willing to participate. Furthermore, the University of Lund partners incoming foreign students with local students that act as "buddies", helping them to cope with new challenges and showing them around. This makes international students feel at home and provides international experience, including language and soft skills, to "native" students.

Source: University of Lund (2017).

Notes

1. Gottfried Wilhelm von Leibniz, a German mathematician and philosopher made several major contributions to physics and anticipated concepts that emerged many decades later in a wide array of sciences, such as probability theory, biology, medicine, psychology, linguistics, and computer science.

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Chapter 5

Strengthening entrepreneurship support in Hungarian higher education

This chapter expands on the findings presented in Chapter 2 related to entrepreneurship support in higher education institutions (HEIs). So, far, the focus has been on entrepreneurship education. Education activities that provide for a confluence of theory and practice are an ideal environment to nurture innovation and entrepreneurship. In the classroom, however, it often happens that theory takes over, leaving little room for experiential learning. Proximity to scientific knowledge and this type of support is often the reason why student start-ups want to stay as close as possible to their academic environment. The chapter explores current strategies and practices to support entrepreneurship in HEIs and provides learning models on how best to involve students and effectively embed support measures offered by the HEI within the wider local start-up support ecosystem.

Introduction

Globalisation, international conflicts, climate change and institutional failures are just some of the conditions that cannot be ignored and that provoke large-scale involvement of individuals to play an active role in creating viable solutions (Senge et al., 2005). Effective involvement calls for the sense of initiative and the right set of attitudes, knowledge and skills to identify opportunities and act upon them; what is commonly referred to as entrepreneurship as a key competence.

In Europe, there is a fairly strong tradition of people seeing themselves as "job-takers" rather than "job-makers" (Herlau and Tetschner, 2014). For a long time, education institutions have been preparing students for a working life in established organisations, which has left only little space in the curriculum to develop initiative-taking and entrepreneurship. This has changed, and a growing number of experiences from several countries, especially from the United States and some European countries, particularly Finland, Sweden, Iceland and the United Kingdom, show that developing the entrepreneurial mindset in education can have great impact on the enterprising behaviour of the country. Of course, it is not possible to change attitudes and behaviour through education alone, but a certain degree of positive influence can be achieved.

The growing understanding that education is an essential means to foster entrepreneurship as a transversal key competence has led, particularly in higher education, to educational proclamations, different forms of co-operation with external stakeholders, resource allocation models, new specifications in performance contracts etc. The aim is to provide for a sector holistic approach to entrepreneurship and initiative-taking, including aspects of creativity, imagination, and organisational entrepreneurship (intrapreneurship). Many of the skills needed for launching a start-up – identify and act upon opportunities, fundamental knowledge of how to manage risks, secure and deploy resources etc. – are the same skills that an employee will need in an existing organisation to successfully implement a new idea. Whereas the employee is likely to have less responsibility than an entrepreneur, both act upon the central premise of creating value.

Entrepreneurship support in higher education has manifested itself in different ways (European Commission, 2008). Definitions and terminologies often vary so much that it is hard to establish a common understanding. When it comes to what actions and priorities to take, confusion can be great and the road towards substantive achievements may feel like a very long journey with sudden interruptions and uncertain detours. Nevertheless, the enthusiasm for and attention on entrepreneurship support in higher education have never been greater than at present, and this includes most of the key stakeholders. As Gibb (2005) pointed out more than a decade ago:

> "[…] the role of entrepreneurship in society, and perhaps the major reason for its current political popularity, is that it provides an opportunity for individuals and organisations of all kinds and in all walks of life to cope with, provoke, and perhaps enjoy, an increasingly complex and uncertain world."

Students, educators, researchers and the leadership of higher education institutions (HEIs) want to improve the amount, content, quality and outcomes of entrepreneurship support. However, governments, intergovernmental organisations, employers, non-governmental organisations, parents and society are also demanding more focused efforts on developing the right competencies for learners to take an active part in technology development, knowledge economy and co-creation.

So far, the focus of entrepreneurship support in HEIs has been on entrepreneurship education. Teaching and learning are central areas for HEIs to provide students with the appropriate methods to gain and apply knowledge and skills. What students learn in the classroom can be greatly enhanced through participation and practice, for example, when student teams define and work on their own projects supported by educators and trainers, who act as enablers, and professional and technical mentors in developing the projects.

Some of these projects may lead to start-ups. Proximity to scientific knowledge and this type of support is often the reason why student start-ups want to stay as close as possible to their academic environment. The move towards offering start-up support in HEIs is thus, to a great extent, driven from the bottom up, often coming from students who want to take their start-up ideas further while studying. This calls for structures and initiatives in the HEI to support this. Students' engagement, the encouragement of faculty members and lecturers, and the visibility of such collective drive and enthusiasm towards (local) businesses and society, are key enablers for the HEI to transform from an educational institution into an incubator, or "hatchery", for new ventures with growth potential.

When starting up a business, more than just the right mindset is needed to succeed. As the Global Entrepreneurship Monitor has shown, several countries with high start-up rates show issues concerning the sustainability and viability of new firms. Many new firms apparently lack competencies in doing business effectively. The idea of the HEI as a "full service provider" covering the process from awareness, the sparking of an initial idea, to supporting the creation of a new venture is getting more and more common. However, close co-operation with start-up and business support organisations outside the HEI and a division of tasks are needed to develop a support system which is compatible with the complex world of an HEI. The presence of talented and knowledgeable students who want to engage in their own businesses, often in teams, is frequently the catalyst for external organisations and HEI leadership to start a partnership.

Reaching a critical mass in entrepreneurship support is an important tipping point when it comes to creating traction within already existing ambitions and efforts. Building a functioning entrepreneurship support system can often seem a large mountain to climb, but the higher the ascent, the better the view and the understanding of the journey ahead. The first steps seem hard and uncoordinated, but it is a question of getting the HEI and its key internal and external stakeholders to buy into the effort. Celebrating every little success will give the enthusiasm and stamina to continue the journey. One way of raising interest in entrepreneurship is to have role models among students and academic staff, who are instrumental for the journey to continue, and, even more important, is to celebrate success stories, even if they may seem small.

The culture of education is changing and this calls for radical thinking, alternative methods and, most of all, new constellations and ways of collaboration to involve key stakeholders (Binks, 2005). Building an entrepreneurial HEI is a constant journey, and elements, choices, engagement, and prioritisation are context-specific and unique for each

HEI. It is important to i) make a strategic choice to become a (more) entrepreneurial university, ii) prioritise areas for action, and iii) communicate the strategy and related activities internally and externally. Key success factors in this are bringing together key stakeholders and the sustainability of resources.[1]

Analysis and findings

Strengthening the practice dimension in teaching and learning

Most of what is needed to succeed with a new idea can and should be learned while at university. To this end, professional, technical and vocational "hard" skills are blended with "soft" skills that make it possible for the individual/team to identify opportunities and act upon them. "Practice" was also considered an important part of these activities. By working in close contact with companies, students get valuable insights into the mechanisms, daily routines and procedures that constitute the companies' practical day-to-day work. Organising this through extra-curricular activities is one way, but prioritising such an approach as an integral part of study programmes is the most efficient way for entrepreneurship education to serve as an educational and cultural game changer. Often, small elements in the method of teaching can deliver this in courses and programmes, even if the overall curriculum remains the same. Efforts in this area have already started in Hungary with the inclusion of entrepreneurship as a key competence in the training and outcome requirements of higher education.

There is overall awareness that one-way teaching with little embedding of practice will not be effective in stimulating entrepreneurial thinking and action. More student-centred approaches to education are needed, as these will help students to develop more hands-on experience when it comes to applying the acquired knowledge and skills. In this way, the teaching is balanced between a theoretical and an (apparently more desirable) practical approach. As Gibb (2005) pointed out, "[…] in an entrepreneurial programme, the challenge is to maximise the opportunity for the 'practice in use' of acquired knowledge, simulating the learning world of the entrepreneur by the learning processes of doing, copying etc."

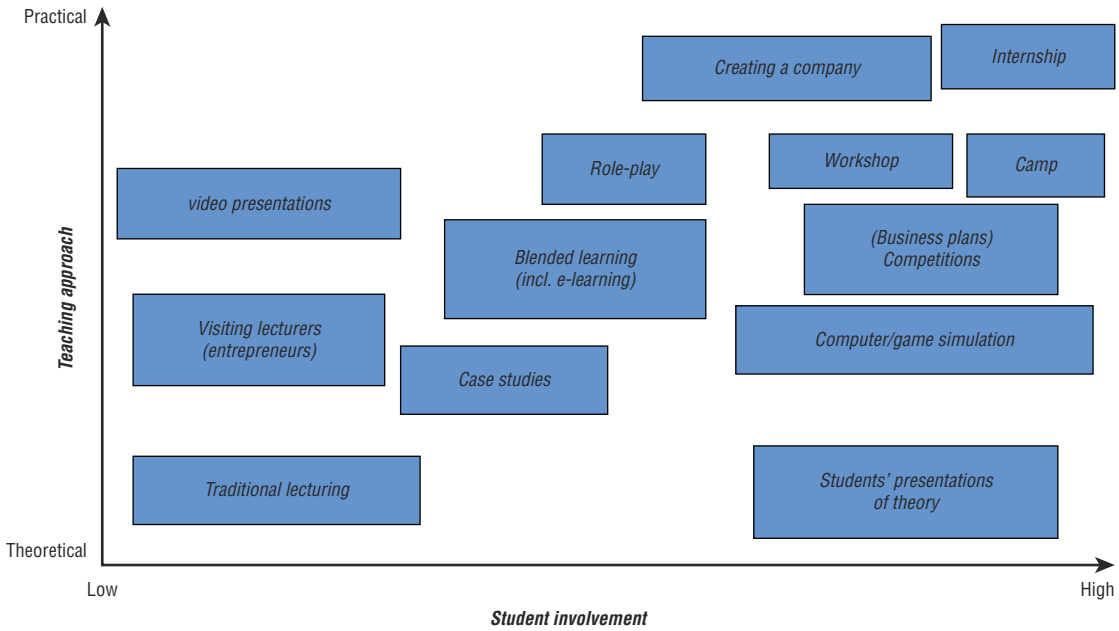
Education activities that provide for a confluence of theory and practice are an ideal environment to nurture innovation and entrepreneurship. In the classroom, however, it often happens that theory takes over, leaving little room for experiential learning. As stated in a policy paper by the National Council for Graduate Entrepreneurship in the United Kingdom, "entrepreneurial creativity and its realisation in practice requires an integrative approach since it needs a mixture of knowledge and understanding, interpersonal skills and competences and various thinking styles and behaviours in order to be successful" (Binks, 2005).

Including some form of practice in education is often organised by inviting employers to play an active role in classes. Examples are giving guest lectures, presentation of a (business) case study, hosting study visits and internships, and acting as coaches and mentors. Practical input, even if highly context-specific, can still be valuable for the students (and educators), especially when it comes to business creation, how to get in touch with customers and investors, enter into co-operation and alliances etc. This is not just something the students "play at" – it is something they do for real.

Research evidence supports the idea that the participatory teaching method and embedding the practice element are indispensable for the students to make a valuable contribution to society during their studies and immediately after graduation. When

participation and practice form the basis for teaching, students will perceive the educational content as more "tangible", and this helps them to get/stay engaged with their education. This is also important for lifelong learning in light of technology development, and knowledge co-creation. There are various teaching approaches which are based on participation and practice. Figure 5.1 shows different forms of student involvement in entrepreneurship education activities. The main aim is to create learning situations where there is a balance between theory and practice, which allows the student to acquire a balanced perception and skill-set of the subject/theme at hand when it comes to combining theory with practice.

Figure 5.1. **Elements of student involvement in entrepreneurship education**



Source: Stolt and Vintergaard (2009).

Students can be important catalysts for novel approaches

Even though the majority of students (in practically all countries and HEIs) may be largely unaware of, or indifferent to venture creation as a viable career option, there will always be a group of interested students to build on. This is also the case for the five visited HEIs. The review team met students with great enthusiasm and drive, and even though they had some doubts about whether the HEI leadership will continue to prioritise entrepreneurship, many of them considered the current efforts and support as relevant and expandable.

When a certain level of demand for entrepreneurship support is reached, HEIs may also consider giving individual students or a student association the task and matching resources (e.g. budget and premises) to develop the entrepreneurship support system at the HEI. Engaged students are "worth the money" (which is often a very small amount seen in the big picture). With their commitment and new/unconventional ideas to make things happen, these students become inspiring role models for other students. This does not mean that the students themselves should be responsible for developing the HEI's entrepreneurship support; they are a potential upgrade-lever within a joint effort.

Involving student organisations in entrepreneurship support

The critical mass in entrepreneurship needs to grow in Hungary's HEIs and student organisations can play an important role in this. They can put in manpower and efforts, which the HEI may have difficulties providing, and many HEIs across Europe build on their engagement. The HEIs can support student organisations by giving them access to office space, auditoriums for events, and minor financial support. An example is Business Booster Sofia at Sofia Technical University in Bulgaria (Box 5.1).

Box 5.1. **Business Booster Sofia at Sofia Technical University (Bulgaria)**

Business Booster Sofia (*www.booster.bg*) was founded in 2012 by a group of engineering and economics students from Sofia Technical University. It recently registered as an association. The aims are to:

- Motivate students to be more entrepreneurial and innovative, by showing how significant they are for the national economy.
- Create a sustainable entrepreneurship environment which is easily accessible to students.
- Establish a meeting point of students from different backgrounds – a co-working space/ incubator for the new ventures.
- Organise education courses aiming to increase motivation and knowledge on the importance of start-ups and the steps of starting-up a business.
- Provide information about potential sources of financing, business partners, standards and intellectual property rights.
- Establish working connections with real businesses to foster the application of university research.
- Create a network of committed mentors and investors, ultimately to establish a dedicated technological start-ups investment fund.

All activities in Business Booster Sofia are carried out with the students' own resources (knowledge, experience, time, connections) on a voluntary basis. Business Booster Sofia collaborates with LaunchHUB, Eleven, the Association of Business Clusters in Bulgaria, the Chambers, Junior Achievement Bulgaria, and various government offices.

Classes are offered in the early evening to allow all students to attend. Courses last on average two months and are focused on technology topics (e.g. cleantech, fintech etc.). The first cohort has already graduated. Applications for the second course were so numerous that parallel classes have been organised to keep the dynamics of small interdisciplinary groups.

Source: OECD (2015).

Often, students and researchers are only exposed by "accident" (word of mouth) to creativity workshops and similar. A structured effort (e.g. undertaken by a student association) to map and publish all relevant activities in the wider start-up support community (universities, public, private) is a way to draw attention to the manifold possibilities, which are likely to exist within or not far from the HEI. This also paints a more diverse picture of what is really happening in the local economy and can engage students from various study programmes (i.e. reaching beyond economics, business and technical studies). A simple way of creating awareness and passing on information about entrepreneurship is to scan the "market" for events, activities, seminars, workshops or similar and gather them centrally on the university's website.

One way of raising interest in venture creation is to have role models among students and faculty members, and, even more important, to expose and celebrate the successes of the entrepreneurs and their companies. An initial focus on the HEI's geographical proximity may also help to build and strengthen its role in the local economy. Activities such as "Career Days" where (local) companies visit the HEI to speak about their company (and eventually recruit future employees) are common at many HEIs worldwide. "Start-up Days" with local and graduate start-ups are another way to stimulate interest in entrepreneurship. They could be organised in co-operation with local authorities and organisations, the university, and graduates/alumni. Students can be the drivers of this. It is important that such an event is organised on the HEI's premises. Familiarity with the venue and the presence of HEI leadership and faculty members will raise the credibility and integrity of the event. The visibility of such initiatives is very important for the students (and faculty for that matter), particularly when the aim is to establish and nurture an entrepreneurial culture. A relevant learning model is SEA, Supporting Entrepreneurship at Aalborg University (Box 5.2). A main goal of Aalborg University is to expose all students to the possibilities of starting new ventures. This involves exposure to, and provoking of, the full range of enterprising behaviours, not only in the form of commercial activities or for-profit ventures, but also in terms of activities and achievements that create value in a broader and more altruistic sense. Students are encouraged to create partnerships with other students who share mutual interests and the desire to "create something".

Box 5.2. **Student-centred entrepreneurship support at Aalborg University (Denmark)**

Aalborg University (AAU) in Denmark was founded in 1974. From initially 3 000 students, AAU grew to approximately 20 000 students, who can choose from more than a hundred study programmes, at Bachelor, Master and Doctorate levels, and three different geographic locations across Denmark.

Teaching and learning at AAU are centered on problem-based and project-organised pedagogies. The so-called "Aalborg model" trains students in independent learning, which is often embedded in the local business community, and is thus close to real-life problems. Students learn to identify and analyse problems, to carry out result-oriented work, and to work successfully in teams. Most of these learning objectives are similar to what is required starting up and developing one's own business. Hence, entrepreneurship is an integral part of AAU's core strategy and elemental to its innovation approach as a knowledge-generating and culture-bearing institution that contributes to technological, economic, social, and cultural innovation.

Entrepreneurship support at AAU is co-ordinated by SEA, Supporting Entrepreneurship at Aalborg University, working across all faculties. SEA's budget is financed one-third from the AAU main budget and two-thirds from external sources. SEA offers a range of different activities, including awareness creation events, learning activities "about, for and in" entrepreneurship, provision of incubator facilities, and intensive collaboration and networking with external partner organisations.

All of SEA's activities have been developed in close collaboration with AAU researchers, external stakeholders, and students. Getting everyone on board with the premium importance of entrepreneurship and innovation, as clearly stated by AAU senior management, helped to spread activities across faculties and embed them into curricula.

Box 5.2. **Student-centred entrepreneurship support at Aalborg University (Denmark)** *(cont.)*

A highlight is WOFIE, an annual four-day interdisciplinary workshop on idea development, creativity, business development and risk-taking, for all AAU Master students or PhDs. It is organised simultaneously and video streamed between the university's three campuses.

Source: Author's own work, based on Aalborg University (2017).

Start-up support

For students, start-up support may in many ways be seen as a more relevant and effective way to achieve their dream of starting their own business than following courses on entrepreneurship. Many of these courses are centred on business plan writing, which may be less effective and even counterproductive compared to more active strategies of experiential learning, which underpin idea generation, selection and implementation. Education activities based on business plans tend to be more academic exercises than action-oriented, and immediate action is needed when setting up a venture. Instead, targeted support is more focused on the immediate needs and challenges of student entrepreneurs.

For students, managing the requirements of a full-time study programme while pursuing a start-up dream can be difficult, but HEIs can help to maintain a balanced workload between these two objectives. Allowing students to use incubators and physical spaces, such as co-working spaces, maker spaces and laboratories, increases the presence of students on campus and builds connections between their educational programme and their start-up. Open meeting spaces for students and start-ups can facilitate exchange and networking. The involvement of students working as interns in student/graduate start-ups is an emerging practice in HEIs across Europe. Furthermore, the location on campus or in close proximity to the academic activities provides an opportunity for the start-ups to explore challenging tasks in an academic set-up, which yields material for genuine case studies and follow-up research.

It is often this kind of basic support, along with the engagement and enthusiasm of dedicated faculty members and/or administrative staff, which triggers in students the desire for an entrepreneurial career. Only a few HEIs in Hungary offer basic start-up support for students and staff. Would-be entrepreneurs often pursue their dream of venture creation on their own and outside the HEI. Information on campus about existing support – within the HEI and outside – is not easily accessible, and, even if it does exist, is often hidden too deeply on a website. Existing support services often rely on a small group of people or are delivered by faculty members outside of their working hours.

Building a basic start-up support system on campus should thus be considered a priority for the near future. There are several policy initiatives that seek to develop the start-up ecosystem in Hungary (see Chapter 1). It will be important that the entrepreneurship support in HEIs becomes an integral part of such local, regional and national systems. The current offer of basic start-up support is not well-connected with more advanced support. This is an area that is not fully developed as yet in the country, which causes limitations for entrepreneurship support in HEIs. As it is not the primary task of HEIs to deliver more than just basic support, pathways are needed for nascent entrepreneurs to move quickly into a local entrepreneurship ecosystem which offers advanced and specialised support in

business development support, financing, mentoring, access to networks, etc. This requires a strong collaboration and relationship with local, regional and even national entities and organisations providing start-up and business development support. This was largely absent or underdeveloped in the visited HEIs.

Greater emphasis on soft skills in venture creation support

Risk-taking, language, execution, team work, ideation, interpersonal capabilities, and how to manage change are some of the prerequisites that are needed when it comes to identifying and acting upon ideas – and these can all be learned. Hence, what are often referred to as "soft" skills actually become "hard" skills. Business knowledge in marketing, sales, financing, planning, and management are of course relevant and useful requirements to have, but these can be learned much more easily by immersion in a real situation, thus outside the classroom or after graduation. It is not knowledge about numbers or market potential that pushes a great idea; it is the ability to have the idea in the first place, engage others in its development, perform well in a team, and make use of the "know-who" more than the "know-how".

The focus on business plans and the use of them in business plan competitions should be downscaled. Even though the business plan often offers good and relevant considerations, the development of business plans seems to make such plans into academic exercises and takes away the focus from what the entrepreneur really needs onto what he or she thinks that the stakeholders might like to hear. Many interview partners underlined that cognitive learning, inter- and transdisciplinarity, communication, project- and problem-based learning, as well as experimental learning, are much more important for venture creation than business-plan writing, spreadsheets and marketing expertise. The latter can almost always be acquired somewhere or sometime else, but what really gets an idea and team going is to recognise opportunities and act upon them and the ability to create enthusiasm and commitment. Collaboration, how to work with others, obtaining the right resources for your project and being able to create instant development and improvement (prototyping, iterative processes etc.) are very important success factors. The Business Model Canvas and Lean Startup are useful methods to foster these skills (Box 5.3). Both methods have their roots in doing (action) and prototyping rather than descriptions (business plans), which are claimed to be counterproductive, unrealistic and without focus on action.

Box 5.3. **Business Model Canvas and Lean Startup**

The aim of most business plan writing exercises is to gain additional resources for the project, and if by resources we mean financing, the most important thing for financers is security and certainty for them that their investment is good. Security from banks and investors can, however, be secured in other ways. Greater emphasis should be on the more tangible and action-oriented features of the start-up; i.e. the personality, drive, and engagement of the entrepreneur(s), an account of what has been done so far and what the next steps are, the identification of the entrepreneur's network and connections (the "know-who" factor) and how well he or she (or the team) can establish and make use of these connections.

Practicing the writing of business plans can be seen as an easy way to engage students in the development of both the mindset and execution of enterprising behaviour or venture creation. However, the business plan is more and more often seen as a reactive, irrelevant

Box 5.3. **Business Model Canvas and Lean Startup** *(cont.)*

and more or less useless piece of paper. The tendency internationally goes towards business models and actions, thus introducing Business Model Canvas and Lean Startup.

Business Model Canvas is a strategic management and entrepreneurial tool that allows the entrepreneur to describe, design and challenge a business model. It is a new way to proceed in a fast changing world, where business models, rather than products, are predominant. The Business Model Canvas is a template for developing new or documenting existing business models through a visual chart with elements describing a firm's or product's/service's value proposition, infrastructure, customers, and finances.

Lean Startup is a method for developing businesses and products by shortening the start-up's product development cycles. It combines experimentation along different hypotheses with iterative product releases and validated learning. The concept is based on an approach that pushes the start-up to focus on iteratively created products or services that meet the needs of early customers, and, in this way, reduces market risks by sidestepping the need for large initial funding and expensive product launches, which may fail.

Source: Author's own work, based on Strategyzer (2017) and Lean Startup (2017).

Simplifying commercialisation processes

Basic and applied forms of research go hand-in-hand. A decline in public funding for research and growing expectation that the knowledge (co-)created in and with HEIs will deliver new solutions, products and services for a better future, makes partnerships in creating, transforming and applying knowledge paramount for today's research. Ideally, partnerships are based on mutual interests and create value for all involved parties. Experts in the technology transfer offices (TTOs) are able to match potential partners with relevant research groups, explaining tangible reasons for collaboration. They will become "salesman of knowledge", but keeping integrity and excellence in research as unique selling points.

The energy spent on technology transfer efforts at HEIs worldwide seems to have far less effect than the resources put into support for business start-up and early development. International experience shows that the effort spent on intellectual property rights and licensing does not, in the long run, provide sufficient outcome and financial output that justifies the attention given to them. Greater emphasis should be placed on start-ups and spin-offs as these are the real value-makers and job creators in the short and the long term. The support should ideally be offered in collaboration with, and physically located in, the incubators' facilities and science parks, with regular activities, such as technology scouting events taking place at HEIs, and in collaboration with the industry clusters in the relevant region. Specialised support demands personnel with special skills, knowledge and contacts. It will be important to also focus on the (initial) commercialisation of research and on IPR and licences, rather than overly focusing on the latter.

The existing system for approving and setting up a university spin-off seems to be far too complicated, as it deprives the HEI of the possibility to act professionally on a potential commercialisation opportunity. There are two main problems. Firstly, the current system does not create interest in spin-off activities as a way to commercialise research among faculty members, even if they find a valuable idea/invention/research result. Secondly, the current system suffers from scarce resources; TTOs often lack the human resources to actively scout for commercialisation opportunities across the HEI.

As a principle, the HEI should not take equity from a student start-up. It is common practice to teach students that everything usually comes at a price, but the initial and basic support at the HEI – creating some kind of safe environment/lab for the entrepreneurial student – should be totally free of charge. Students should pay back through helping other student entrepreneurs and sharing experiences. Students are the core part of the critical mass, and are ambassadors that brand the HEI at home and abroad.

Connecting the dots: Inclusive and dynamic venture creation support

The emphasis in venture creation support in Hungarian HEIs has so far has been more on spin-offs, that is, ventures created upon research results and with the involvement of the HEI, than on student start-ups. As discussed earlier in this report, spin-offs are considered an additional source of income for the HEI, a way to build the reputation of the HEI and its research, as well as career and funding opportunities for individual researchers or research groups. The few examples of start-ups among the students are initiatives that would have emerged anyway, as these are driven by young people that have already set their minds on going into this realm. There is nothing wrong in having a strong TTO and well-functioning structures for the commercialisation of research results, but a strategic balance between TTOs (primarily working for spin-offs and patenting) and incubators (primarily working with student start-ups) should be discussed and established according to current and future potentials in both areas.

Both spin-offs and start-ups benefit from venture creation support. A strong basic venture creation support, linked with other support structures locally, regionally and nationally, is likely to attract students and staff who wish to create value through entrepreneurship, thus creating new role models, and overall a distinctive knowledge-intensive brand for the HEI. There are many examples of large and impressive incubators and substantial support structures, but what is necessary and relevant is the scope that suits a specific HEI and its context. Instead of large-scale solutions, an approach is needed that starts with matching the given resources and the needs and expectations of students.

The "rule of thumb" is to make venture creation visible and easily accessible. This requires substantive communication both inside and outside the HEI. All and up-to-date information should be available from the HEI's main website. Basic information includes the existing offer, contact persons, office hours, open days and other events that showcase start-ups and entrepreneurial role models etc. Such information should be listed next to information on study programmes, research activities, etc. The official website's information is the responsibility of the university – the underlying layers and links are to be developed more autonomously and organically. Most important is that the one-door-entry is visible on the front-page of the website. Further efforts include reaching out into student networks, educator networks, external partners, etc. (European Commission, 2010).

Offering physical workplaces where nascent entrepreneurs can meet and making these accessible for external stakeholders is also important. This can be initiated even with only a few places. Most (small) incubators grow by word-of-mouth.

A good idea is to include international students when it comes to promoting such initiatives. They are catalysts for quick(er) growth as they often have more time and desire to engage in such activities while they are studying abroad. Student incubators should create and nurture an open and creative culture where student entrepreneurs share ideas, visions, mistakes, and successes in order to learn and act. The practice of sharing ideas and holding

events on personal experiences and learnings, plays a pivotal role in student start-up support all over the word. It was a general feature at the meetings with Hungarian students that the fear of getting their ideas stolen made them hold back these ideas, thus preventing them having valuable input and feedback that could help to further develop their ideas.

Efforts should be put into creating a network of start-up alumni. Members could be invited to contribute to the design and delivery of the day-to-day offering of support at the HEI. Start-up alumni, in turn, have access to talented students and stay in touch with the academic community and research activities. This "giving back" from graduate start-ups is free of charge for the HEI and the positive attention generated through hosting now famous and successful" former students is likely to have self-perpetuating effects on the attractiveness of future events.

Basic start-up support should always be connected with more specialised support structures. Offering new ventures emerging from the HEI a smooth transition from basic support (offered largely by the HEI), to advanced support, requires a strong collaboration and relationship with local, regional and even national entities and organisations providing start-up and business development support. Instead of waiting for nascent entrepreneurs to contact external support providers, there is a tendency to establish support facilities directly on campus. Often, organisations collaborate in bringing the support directly to the HEI, and also HEIs join efforts and resources, in particular when the latter are scarce.

There are different ways of connecting the different parts of an entrepreneurial ecosystem. A truly entrepreneurial university engages with the right partners to provide adequate support, but equally important, is the ability to be part of a fully integrated partnership with other stakeholders and partners in the innovation ecosystem. A relevant learning model that summarises these efforts into a coherent and strong communication strategy is Plymouth University (Box 5.4).

Box 5.4. **Stakeholder engagement at Plymouth University (UK)**

Plymouth University is a unique example of how a university can develop and promote itself as a truly enterprising university. This is not only when it comes to rhetoric and appearance within entrepreneurship (sub-) websites, but the overall communication strategy aims to present the university at the forefront of development, attitude and content in all its efforts in general. Such a communication strategy makes way for positive language and exposes the good practices and – most importantly – the real intentions of the university. This provides a positive attitude and well-defined brand when it comes to attracting students interested in entrepreneurship, as well as stimulating the ones already present in the university.

Plymouth University may not offer support or services that are so different to many other entrepreneurial universities in the world, but the positive and proactive language combined with the prominent appearance on the website invites further investigation and study within the area. A very interesting feature, however, is their Customer Charter, that specifically explains the philosophy and attitude towards what it means to be an entrepreneurial university. Even though the charter states some obvious elements in start-up support (and beyond), it is also an important element as a guideline and codex for the self-perception of the administrative staff, faculties and management at the university.

Box 5.4. **Stakeholder engagement at Plymouth University (UK)** *(cont.)*

Another feature is the list of partnerships, including links to science parks, chambers of commerce, innovation agencies, business councils, other start-up support entities, local firms etc. This emphasises the importance of having close collaboration with the ecosystem surrounding the university to provide the best support possible. Even though the university is not responsible for the more advanced support, the important thing is to be able to point students in the right direction when it comes to specialised start-up support.

Source: Author's own work, based on Plymouth University (2017).

Notes

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Annex

HEInnovate framework and good practice statements

1. Leadership and governance

Strong leadership and good governance are crucial to developing an entrepreneurial and innovative culture within an HEI. Many HEIs include the words "enterprise" and "entrepreneurship" in their mission statements, but in an entrepreneurial institution this is more than a reference. This section highlights some of the important factors an HEI may consider in order to strengthen its entrepreneurial agenda.

1.1. Entrepreneurship is a major part of the HEI's strategy

An HEI should see itself as an entrepreneurial organisation and environment, held together by a common vision, values and mission. The strategy of an HEI should reflect its entrepreneurial aspirations and agenda.

To score highly, an HEI could, for example:

- Have a mission statement and written strategy, setting out an entrepreneurial vision for the future of the institution
- Have a strategy which clearly emphasises the importance of entrepreneurship, culturally, socially and economically
- Articulate a clear implementation plan to achieve its strategy and vision with clear objectives and key performance indicators
- Provide examples of how the strategy and vision create opportunities across all aspects of the institution and its wider community

1.2. There is commitment at a high level to implementing the entrepreneurial agenda

A deep commitment at senior management level of an HEI is needed to drive the implementation of the entrepreneurial agenda.

To score highly, an HEI could, for example:

- Communicate the strategy across the institution, and make sure that it is understood as a priority by staff, students and stakeholders
- Ensure that there is a dedicated person at a high level/senior management responsible for the implementation of the entrepreneurial vision and strategy
- Provide a strategic roadmap presented in a simple format that is widely communicated throughout the HEI
- Articulate how the entrepreneurial strategy is regularly reviewed and revised to keep it up-to-date and relevant

1.3. There is a model in place for co-ordinating and integrating entrepreneurial activities across the HEI

An HEI needs an effective model for co-ordinating and integrating innovative activities across the institution. There are a variety of models which can be used, such as:

- A dedicated person at senior management level

- A dedicated unit close to senior management
- Co-ordination linked to a specific staff or faculty member
- Co-ordination by a centre for entrepreneurship/innovation

To score highly, an HEI could, for example:

- Build on existing relationships and activities
- Co-ordinate and integrate entrepreneurial activities across departments, faculties and other centres
- Co-ordinate activities with other stakeholders within the local entrepreneurship ecosystem

1.4. The HEI encourages and supports faculties and units to act entrepreneurially

An HEI with open, flexible and devolved approaches finds it easier to undertake innovative activities and speed up decision-making. An HEI should provide an environment that encourages idea creation and the emergence of new activities and initiatives.

To score highly, an HEI could, for example:

- Allow faculties or units within the institution to take full responsibility and ownership of the development of new structures and centres
- Ensure ownership of and allocate responsibility for the development of new activities and initiatives that stimulate entrepreneurial capacity
- Support the faculties or units through a range of incentives and rewards linked to the demonstration of entrepreneurial and innovative outcomes

1.5. The HEI is a driving force for entrepreneurship and innovation in regional, social and community development

An HEI can play several roles in its community and wider ecosystem. One of the key functions of an HEI is to support and drive regional, social and community development.

To score highly, an HEI could, for example:

- Be actively involved in the development and implementation of the local, regional and/or national innovation and entrepreneurship strategies
- Provide general access to the facilities of the institution to others in the wider community
- Support start-ups and/or established companies in the region to enhance innovation and growth
- Have a strong presence in its communities, for example, by supporting local cultural and artistic activities

2. Organisational capacity: Funding, people and incentives

The organisational capacity of an HEI drives its ability to deliver on its strategy. If an HEI is committed to carrying out entrepreneurial activities to support its strategic objectives, then key resources such as funding and investments, people, expertise and knowledge, and incentive systems need to be in place to sustain and grow its capacity for entrepreneurship.

2.1. Entrepreneurial objectives are supported by a wide range of sustainable funding and investment sources

Becoming an entrepreneurial HEI is an incremental and long-term organisational development process that requires a sustainable and diverse financial basis and access to key resources and investments.

To score highly, an HEI could, for example:

- Ensure a close link between its long-term commitment to investing in entrepreneurial and innovative activities and its financial strategy
- Continuously engage with funders and investors to secure financial resources to deliver on its objectives
- Aim for a balanced and diversified range of funding and investment sources, including in-kind contributions
- Reinvest revenues generated from leveraging their own research, teaching and third mission activities (self-funding)

2.2. The HEI has the capacity and culture to build new relationships and synergies across the institution

All internal stakeholders, staff and students, have a role in supporting an HEI's entrepreneurial agenda. Encouraging dialogue and synergies between the administration, academic faculties and staff, students and management helps break down traditional boundaries, foster new relationships and exploit internal knowledge and resources.

To score highly, an HEI could, for example:

- Promote shared facilities across faculties
- Establish structures for staff-student dialogue and decision making
- Create and support interdisciplinary structures
- Support cross-faculty teaching and research groups

2.3. The HEI is open to engaging and recruiting individuals with entrepreneurial attitudes, behaviour and experience

An HEI can build an entrepreneurial culture and fulfil its objectives by engaging stakeholders with a strong entrepreneurial background and experience. These individuals can bring different viewpoints, knowledge, and expertise unavailable internally. Such individuals can be permanent members of staff, guest contributors, visiting associates or external stakeholders.

To score highly, an HEI could, for example:

- Demonstrate the importance it attaches to bringing in people with diverse backgrounds
- Give status and recognition to those who contribute to the institution's entrepreneurial agenda
- Recruit individuals with strong entrepreneurial backgrounds from the private, public or voluntary sectors and outside of academia
- Have mechanisms in place for shared risk and rewards in engaging in entrepreneurial opportunities

2.4. The HEI invests in staff development to support its entrepreneurial agenda

Staff, both academic and administrative, are a key and necessary resource required to deliver on all elements of an HEI's entrepreneurial agenda, including the delivery of entrepreneurship education, provision of support for business start-ups, development of partnerships with other external stakeholders and supporting local and regional development.

To score highly, an HEI could, for example:

- Have a formal policy for career development for all staff linked to the implementation of the institution's entrepreneurial strategy and vision
- Set individual objectives and performance indicators for all staff supporting the implementation of the entrepreneurial agenda
- Measure staff progression against these objectives on a regular basis
- Link the training needs of staff with career objectives that support the entrepreneurial agenda

2.5. Incentives and rewards are given to staff who actively support the entrepreneurial agenda

Encouraging and rewarding entrepreneurial behaviour in all staff reinforces the commitment to developing as an innovative HEI. This includes staff who actively seek out new opportunities to develop the institution in line with its strategic objectives. Incentive and reward systems should be available at an individual level as well as for faculties/departments, extending beyond classic career progression models.

To score highly, an HEI could, for example:

- Adjust staff teaching and research workloads for those who take on new responsibilities that support the institution's entrepreneurial agenda
- Provide institutional funds to staff to stimulate innovation and change
- Provide development sabbaticals for staff who seek to enhance their entrepreneurial capacity
- Instigate systems for rewards beyond traditional research, publications and teaching criteria
- Provide opportunities for professors to work part-time in their own companies (where permissible)
- Make office and laboratory space available for staff to pursue entrepreneurial activities

3. Entrepreneurial teaching and learning

Entrepreneurial teaching and learning involves exploring innovative teaching methods and finding ways to stimulate entrepreneurial mindsets. It is not just learning about entrepreneurship, it is also about being exposed to entrepreneurial experiences and acquiring the skills and competences for developing entrepreneurial mindsets.

3.1. The HEI provides diverse formal learning opportunities to develop entrepreneurial mindsets and skills

An entrepreneurial HEI provides a range of learning opportunities to facilitate innovative teaching and learning across all faculties. Such an HEI should be encouraging innovation and diversity in its approach to teaching and learning across all departments as well as developing entrepreneurial mindsets and skills across all programmes.

To score highly, an HEI could, for example:

- Support curriculum change to stimulate and develop entrepreneurial mindsets and skills through new pedagogies, student-centred, cross-disciplinary and practice-based learning (e.g. living labs, the use of case studies, games and simulation)
- Provide support and training to staff in creating new curriculum related to entrepreneurship

- Provide mechanisms for students to engage in review and feedback on courses
- Introduce new mechanisms for supporting students, including experiencing starting new ventures within the students' formal education or delivering entrepreneurship education with practising entrepreneurs

3.2. The HEI provides diverse informal learning opportunities and experiences to stimulate the development of entrepreneurial mindsets and skills

Extra-curricular learning opportunities are an important complementary part of entrepreneurship teaching and learning provision. An innovative HEI should offer a range of informal learning opportunities to students to inspire individuals to act entrepreneurially.

To score highly, an HEI could, for example:

- Support access to student enterprise clubs, awards and societies
- Organise networking events between students and entrepreneurs/businesses
- Engage students in business idea/plan competitions as part of their extra-curricular opportunities
- Formally recognise extra-curricular activities

3.3. The HEI validates entrepreneurial learning outcomes which drives the design and execution of the entrepreneurial curriculum

An entrepreneurial learning experience provides opportunities to develop important skills and competences. These are essential for both graduate entrepreneurs as well as entrepreneurial graduates entering into employment. An HEI that values entrepreneurial learning commits to regular review, validation, and the updating of course content and learning outcomes across all study programmes.

To score highly, an HEI could, for example:

- Codify the expected entrepreneurial learning outcomes in relation to knowledge, skills and competences in all degree programmes
- Ensure students have a clear understanding of the entrepreneurial learning outcomes expected and achieved
- Validate entrepreneurial learning outcomes at the institutional level
- Recognise entrepreneurial learning outcomes in the students' records of achievements

3.4. The HEI co-designs and delivers the curriculum with external stakeholders

External stakeholders are an important source of expertise that can be used in entrepreneurial teaching and learning. Regular engagement with external stakeholders encourages long-term collaborative relationships that can provide useful inputs to understanding future skills needs as well.

To score highly, an HEI could, for example:

- Regularly review and assess the involvement of external stakeholders in course design and delivery
- Provide a mechanism for staff to work with external stakeholders to develop and deliver high quality course content
- Integrate external stakeholders' experience and expertise into the development and delivery of extra-curricular learning activities and support services

- Support a diversity of collaborative partnerships with local communities and organisations, local and regional governments, chambers of commerce, industry and HEI alumni

3.5. Results of entrepreneurship research are integrated into the entrepreneurial education offer

For a curriculum to stay up-to-date and relevant, the entrepreneurial education offer needs to be continuously reviewed and updated. Therefore an HEI should integrate the results of entrepreneurship research into its teaching.

To score highly, an HEI could, for example:

- Encourage staff and educators to review the latest research in entrepreneurship education
- Provide a forum whereby staff and educators can exchange new knowledge and ideas, incorporating the latest research
- Provide access to inspiration from other HEIs through networking and sharing good practices

4. Preparing and supporting entrepreneurs

HEIs can help students, graduates and staff consider starting a business as a career option. At the outset it is important to help individuals reflect on the commercial, social, environmental or lifestyle objectives related to their entrepreneurial aspirations and intentions. For those who decide to proceed to start a business, or other type of venture, targeted assistance can then be offered in generating, evaluating and acting upon the idea, building the skills necessary for successful entrepreneurship, and importantly finding relevant team members and getting access to appropriate finance and effective networks. In offering such support, an HEI should ideally act as part of a wider business support ecosystem rather than operating in isolation.

4.1. The HEI increases awareness of the value of entrepreneurship and stimulates the entrepreneurial intentions of students, graduates and staff to start up a business or venture

Raising awareness of entrepreneurship in an HEI is about helping people make informed decisions about their careers, including the option of starting an enterprise.

To score highly, an HEI could, for example:

- Provide conducive framework conditions for start-up, such as enabling staff to own shares, work part-time, take sabbaticals, and the possibility for students to extend the duration of their study programmes to support starting a new venture while studying
- Make effective use of communication channels to raise awareness of opportunities and showcase entrepreneurship among staff and students across all parts of the institution
- Celebrate and recognise successes of student, graduate and staff entrepreneurs
- Provide opportunities for students to be involved in research projects leading to entrepreneurial opportunities and to take up internships with entrepreneurs

4.2. The HEI supports its students, graduates and staff to move from idea generation to business creation

An HEI can support motivated students, graduates and staff in taking their first steps in preparing for a start-up. This includes developing an idea, finding a team, and exploring the technical and market feasibility of a project. As well as introducing staff to new networks, an

HEI can offer regular activities to generate and evaluate business ideas emerging across the institution.

To score highly, an HEI could, for example:

- Offer entrepreneurial team building support and conflict management
- Provide intellectual property assistance for potential start-ups
- Create an expert advisory panel for early-stage concepts
- Organise interdisciplinary idea generation activities (e.g. start-up weekends)
- Organise idea and start-up pitch prizes
- Offer funds to support market feasibility studies

4.3. *Training is offered to assist students, graduates and staff in starting, running and growing a business*

Entrepreneurship training can provide some of the skills and competences needed to start, run and grow a business. The training should impart relevant knowledge and skills about a wide range of topics, for example financing, legal and regulatory issues, dealing with people and building relationships, managing innovation processes, coping with success, stress and risk, and how to restructure or exit. Emotional preparation is as important as the technical aspects.

To score highly, an HEI could, for example:

- Offer tailored entrepreneurship courses across all subject areas and levels of study
- Actively recruit students and staff to training activities and monitor levels of engagement
- Involve entrepreneurs and key actors from the entrepreneurship ecosystem
- Use up to date teaching methods focused on learning-by-doing and critical reflection
- Implement mechanisms to increase rates of take-up by diverse groups

4.4. *Mentoring and other forms of personal development are offered by experienced individuals from academia or industry*

Mentoring and other personal development relationships (such as coaching and tutoring) can help start-up entrepreneurs identify and overcome problems and develop their business networks. They provide valuable support in the form of knowledge, experience, social capital and encouragement on a long-term basis. Mentors and coaches tend to be experienced (academic) entrepreneurs, company managers and often alumni.

To score highly, an HEI could, for example:

- Organise visible, accessible and good-quality mentoring and personal development activities
- Actively recruit mentors and provide them with training, resources (e.g. IP assistance), formal recognition and rewards
- Facilitate matchmaking of mentors and protégés
- Provide feedback mechanisms on the contributions from entrepreneurs
- Provide opportunities for peer-to-peer mentoring, such as entrepreneur clubs, where members help each other

4.5. *The HEI facilitates access to financing for its entrepreneurs*

External financing can be essential for the success of a new venture, e.g. providing investment for feasibility and market studies, product and prototype development such as

proof of concept funding, for initial production or for offering the founders some living income before their first revenues are generated.

To score highly, an HEI could, for example:

- Offer financial education to entrepreneurs and potential entrepreneurs to better understand financial concepts and how to apply them
- Organise networking and financing events for aspiring entrepreneurs to pitch their ideas to investors and to get feedback
- Offer microfinance instruments such as grants, prizes, loans and equity
- Utilise its network of potential investors for crowd-funding
- Closely link access to financing activities with training, mentoring and incubation

4.6. The HEI offers or facilitates access to business incubation

Business incubators commonly provide a range of services such as free or subsidised premises, access to laboratories and research facilities, prototyping support, IT and secretarial services and networking. They also offer a visible and accessible location for entrepreneurs to access an integrated package of coaching, mentoring, training, shared platforms and financing.

To score highly, an HEI could, for example:

- Host their own incubators or facilitate easy access to external incubators
- Ensure that their incubators offer a full range of soft support (networking, mentoring, etc.) as well as physical infrastructure
- Promote the incubator widely across campus and host events that engage potential entrepreneurs
- Embed the incubation facilities with the research and education infrastructure of the HEI to enhance synergies

5. Knowledge exchange and collaboration

Knowledge exchange is an important catalyst for organisational innovation, the advancement of teaching and research, and local development. It is a continuous process which includes the "third mission" of an HEI, defined as the stimulation and direct application and exploitation of knowledge for the benefit of the social, cultural and economic development of society. The motivation for increased collaboration and knowledge exchange is to create value for the HEI and society.

5.1. *The HEI is committed to collaboration and knowledge exchange with industry, the public sector and society*

Knowledge exchange through collaboration and partnerships is an important component of any innovative HEI. It provides the opportunity to advance organisational innovation, teaching and research while creating value for society.

To score highly, an HEI could, for example:

- Ensure knowledge exchange and collaboration is a high priority at senior level and that implementation is in line with the institution's entrepreneurial agenda
- Establish structures to exploit knowledge exchange and collaboration opportunities, and encourage staff to engage in such activities
- Include support mechanisms for co-ordinating and sharing relationships across the HEI

- Give guidance on how to develop and implement all types of relationships with the public and private sector

5.2. *The HEI demonstrates active involvement in partnerships and relationships with a wide range of stakeholders*

An innovative HEI understands the value of engaging with multiple stakeholders. There are many types of organisation with whom an HEI can form partnerships. These include, for example, regional and local organisations, quasi-public or private organisations, businesses (SMEs, large and international firms, social enterprises and entrepreneurs), schools and alumni.

To score highly, an HEI could for example:

- Involve external stakeholders in the work of the institution through governance, teaching, research, support for student activities and positions with institutes and centres
- Play an active role in influencing regional governance and regional/local development including entrepreneurship development
- Support entrepreneurship development of schools and colleges through networking and broader engagement
- Provide monitoring and feedback of the mutual value developed through stakeholder relationships

5.3. *The HEI has strong links with incubators, science parks and other external initiatives*

Knowledge intensive structures surrounding an HEI provide opportunities to exchange knowledge and ideas. These include incubators, science parks and other initiatives. An innovative HEI should have systems in place that allow both inward and outward flows of knowledge and ideas.

To score highly, an HEI could, for example:

- Encourage the joint use of facilities
- Have direct financial or management interest in science parks and incubators, ranging from participation to ownership
- Ensure that the flow of people is incentivised in both directions
- Monitor the added value generated through linkages and cross-fertilisation activities

5.4. *The HEI provides opportunities for staff and students to take part in innovative activities with business/the external environment*

An entrepreneurial HEI engages with the external environment through a variety of innovative activities. These can range from informal activities, such as breakfast clubs and networking events, through to more formalised initiatives including internships, learning factories, collaborative research and entrepreneurship projects.

To score highly, an HEI could, for example:

- Provide open spaces and facilities for collaboration with external actors
- Organise events that encourage engagement with external stakeholders, such as lectures, joint workshops, breakfast meetings and other networking events and opportunities
- Encourage, support and recognise mobility of staff and students through internships, sabbaticals, dedicated study programmes (e.g. industrial doctorates, sandwich programmes)

5.5. *The HEI integrates research, education and industry (wider community) activities to exploit new knowledge*

Strong relationships with the external environment help stimulate the creation of new knowledge. An innovative HEI should integrate and assimilate the knowledge generated for extending its entrepreneurial agenda.

To score highly, an HEI could, for example:

- Have mechanisms in place to integrate and absorb information and experience from the wider ecosystem
- Monitor research activities regionally, nationally and internationally to identify new and relevant knowledge
- Initiate dialogue and discussion between the HEI and the external environment for mutual benefit
- Provide support for the identification of new ideas and their mutual exploitation
- Have clear mechanisms for exploiting entrepreneurial opportunities with commercial and industrial partners

6. The internationalised institution

Internationalisation is the process of integrating an international or global dimension into the design and delivery of education, research, and knowledge exchange. Internationalisation is not an end in itself, but a vehicle for change and improvement. It introduces alternative ways of thinking, questions traditional teaching methods, and opens up governance and management to external stakeholders. Therefore, it is linked very strongly to being entrepreneurial. It is not possible for an HEI to be entrepreneurial without being international, but the HEI can be international without being entrepreneurial or innovative.

6.1. *Internationalisation is an integral part of the HEI's entrepreneurial agenda*

An international perspective is a key characteristic of an entrepreneurial and innovative HEI. Most institutions have internationalisation strategies and an innovative HEI will harmonise its internationalisation strategy and entrepreneurial agenda.

To score highly, an HEI could, for example:

- Ensure the internationalisation strategy reflects its entrepreneurial agenda
- Build common objectives and synergies between internationalisation and the entrepreneurial agenda

6.2. *The HEI explicitly supports the international mobility of its staff and students*

International mobility brings in new educational and research ideas, creates intercultural opportunities and long lasting partnerships. In addition to attracting international staff and students, an entrepreneurial HEI actively encourages and supports the international mobility of its own staff and students.

To score highly, an HEI could, for example:

- Link international mobility objectives with the entrepreneurial agenda of the HEI
- Promote international mobility through exchange programmes, scholarships, fellowships and internships

- Apply for European mobility programmes and support the application of staff and students to mobility grants, scholarships and programmes
- Incentivise, recognise and reward international mobility

6.3. The HEI seeks and attracts international and entrepreneurial staff

The internationalisation of an HEI depends upon people who can stimulate new approaches to teaching, learning and research in a global framework, using world-wide reputations and contacts to benefit the HEI's international network.

To score highly, an HEI could, for example:

- Explicitly set out to attract international staff which match the needs of its entrepreneurial agenda
- Have specific international recruitment drives in place
- Develop PhD programmes in collaboration with other partner institutions
- Have a support system in place for the cultural integration of international staff

6.4. International perspectives are reflected in the HEI's approach to teaching

Access to new ideas for teaching and learning in the international environment can increase an HEI's ability to compete on the international market. Therefore an innovative HEI should have a teaching and learning environment tailored to a more global audience.

To score highly, an HEI could for example:

- Invest in an international-orientated curriculum which supports the institution's entrepreneurial agenda
- Ensure the curriculum is set up to prepare students for performing professionally and socially in an international and multicultural context
- Design and develop a curriculum which considers both "internationalisation abroad" and "internationalisation at home" experiences for staff and students
- Support international partnerships and networks which add value to teaching entrepreneurship
- Increase the number of joint/double degrees which include entrepreneurship and innovation in their curriculum
- Include classroom-based activities with an international perspective

6.5. The international dimension is reflected in the HEI's approach to research

Strategic international research partnerships are an important part of an HEI's entrepreneurial agenda. The partnerships should be fully functional, not just paper agreements, and engage both staff and students.

To score highly, an HEI could, for example:

- Ensure that relationships with international research partners support its entrepreneurial agenda
- Develop extensive links with international research networks and innovation clusters
- Have internal support structures in place to manage and grow international relationships
- Use networks and partnerships to feed back into its research agenda
- Ensure all departments and faculties actively participate in international research partnerships and networks

7. Measuring impact

Entrepreneurial/innovative HEIs need to understand the impact of the changes they bring about in their institution. The concept of an entrepreneurial/innovative HEI combines institutional self-perception, external reflection and an evidence-based approach. However, impact measurement in HEIs remains underdeveloped. The current measurements typically focus on the quantity of spin-offs, the volume and quality of intellectual property generation and research income generation, rather than graduate entrepreneurship, teaching and learning outcomes, retaining talent, the contribution to local economic development or the impact of the broader entrepreneurial agenda. This section identifies the areas where an institution might measure impact.

7.1. The HEI regularly assesses the impact of its entrepreneurial agenda

The impact of the entrepreneurial agenda can be wide ranging across research, education and innovation, as well as within governance and leadership, depending on the type of HEI. Understanding whether objectives are being met is crucial, if an HEI is to achieve its intended outcomes.

To score highly, an HEI could, for example:

- Set clear intended outcomes/impacts related to its entrepreneurial agenda
- Collect evidence of the outcomes/impacts of the entrepreneurial agenda
- Use the evidence of the outcomes/impacts as a tool for reflection and review of the strategy and mission of the institution

7.2. The HEI regularly assesses how its personnel and resources support its entrepreneurial agenda

Becoming an entrepreneurial institution may require an HEI to re-think how its personnel and resources are employed. An HEI may need to develop new human resource strategies, leverage external partnerships to overcome internal shortcomings, and secure new sources of financial support.

To score highly, an HEI could, for example:

- Undertake a skills/competence audit against the entrepreneurial agenda to assess its institutional development needs
- Use the information from the skills assessment and embed in recruitment strategies and staff performance appraisals
- Leverage external partners and resources to address any skills gaps
- Review and assess the success of the allocation of personnel and resources at regular intervals

7.3. The HEI regularly assesses entrepreneurial teaching and learning across the institution

Ensuring that entrepreneurial teaching activities reach their full potential requires systematic assessment across all faculties and departments. An entrepreneurial HEI should have set clear objectives, which are regularly monitored and evaluated, and the results fed back into course renewal and staff development plans.

To score highly, an HEI could, for example:

- Set clear objectives for the impact of entrepreneurship courses and activities

- Measure the impact of entrepreneurship teaching and learning at different phases of its implementation (beginning, end, point in time after) to get an accurate picture of change
- Measure changes in participants' motivation and the level of knowledge, skills and competences gained through the entrepreneurship education activities
- Track findings over time and across all faculties and departments

7.4. The HEI regularly assesses the impact of start-up support

It is important to monitor and evaluate start-up support activities to ensure that they are providing the appropriate quality of support in an effective manner. An entrepreneurial HEI should also examine outreach, take-up and the role played by start-up support across all faculties and departments.

To score highly, an HEI could, for example:

- Set clear objectives and intended outcomes/impacts for start-up support activities, including participation rates, satisfaction and outcomes
- Measure the intended outcomes/impacts immediately following the end of support measures and at later dates to measure the success in relation to start-ups
- Ensure the findings are fed back into the development of start-up support activities

7.5. The HEI regularly assesses knowledge exchange and collaboration

Assessing and gaining a better understanding of the HEI's knowledge exchange and collaborative activities can result in increased value creation for both the institution and society. Therefore, an innovative HEI should have mechanisms and activities in place to regularly monitor and evaluate the intended outcomes and impacts of these activities across all faculties and departments.

To score highly, an HEI could, for example:

- Set clear objectives and intended outcomes/impacts for knowledge exchange linked to its entrepreneurial agenda
- Set internal measurements of success such as new research ideas generated, joint HEI-business projects and relationships formed, number of start-ups and spins-offs created
- Set external measurements of success, such as perceived value and impact of the HEI on the wider environment (e.g. business, government)
- Assess these intended outcomes/impacts from an internal and external viewpoint
- Use the evidence of success as a tool for reflection and review of the entrepreneurial agenda

7.6. The HEI regularly assesses the institution's international activities in relation to its entrepreneurial agenda

Having an international perspective is a key characteristic of an entrepreneurial HEI. An entrepreneurial HEI should regularly monitor and evaluate whether its internationalisation strategy supports the development of its entrepreneurial agenda across all faculties and departments.

To score highly, an HEI could, for example:

- Set clear objectives and intended outcomes/impacts for internationalisation activities linked to its entrepreneurial agenda

- Undertake regular mapping exercises of the internationalisation activities in teaching and research to prioritise and further develop its entrepreneurial activities
- Use the evidence of success as a tool for reflection and review of its internationalisation and entrepreneurial agenda

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OECD Skills Studies

Supporting Entrepreneurship and Innovation in Higher Education in Hungary

There is a shift from formal education to a broader perspective that includes a range of hard and soft skills people need to acquire over their lifetime in order to succeed in the labour market. Workers, students, parents, employers, education providers and government agencies now need reliable information on how supply and demand for skills evolve.

The *OECD Skills Studies* series aims to provide a strategic approach to skills policies. It presents OECD internationally comparable indicators and policy analysis covering issues such as: quality of education and curricula; transitions from school to work; vocational education and training (VET); employment and unemployment; innovative workplace learning; entrepreneurship; brain drain and migrants; and skills matching with job requirements.

This report presents evidence-based analysis of current strategies and practices in higher education institutions (HEIs) in Hungary towards a value-creating use of knowledge resources for innovation and entrepreneurship. The analysis and recommendations are highly relevant for policy makers and HEI leaders in other countries. Increased attention to innovation and entrepreneurship both from public policy actors and HEI leadership has triggered an incremental change process in the organisational culture of HEIs and a new approach to education and research for students and staff. HEInnovate is a joint initiative of the European Commission and the OECD to promote the innovative and entrepreneurial higher education institution across Europe and beyond (www.heinnovate.eu).

Consult this publication on line at ***http://dx.doi.org/10.1787/9789264273344-en***.

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