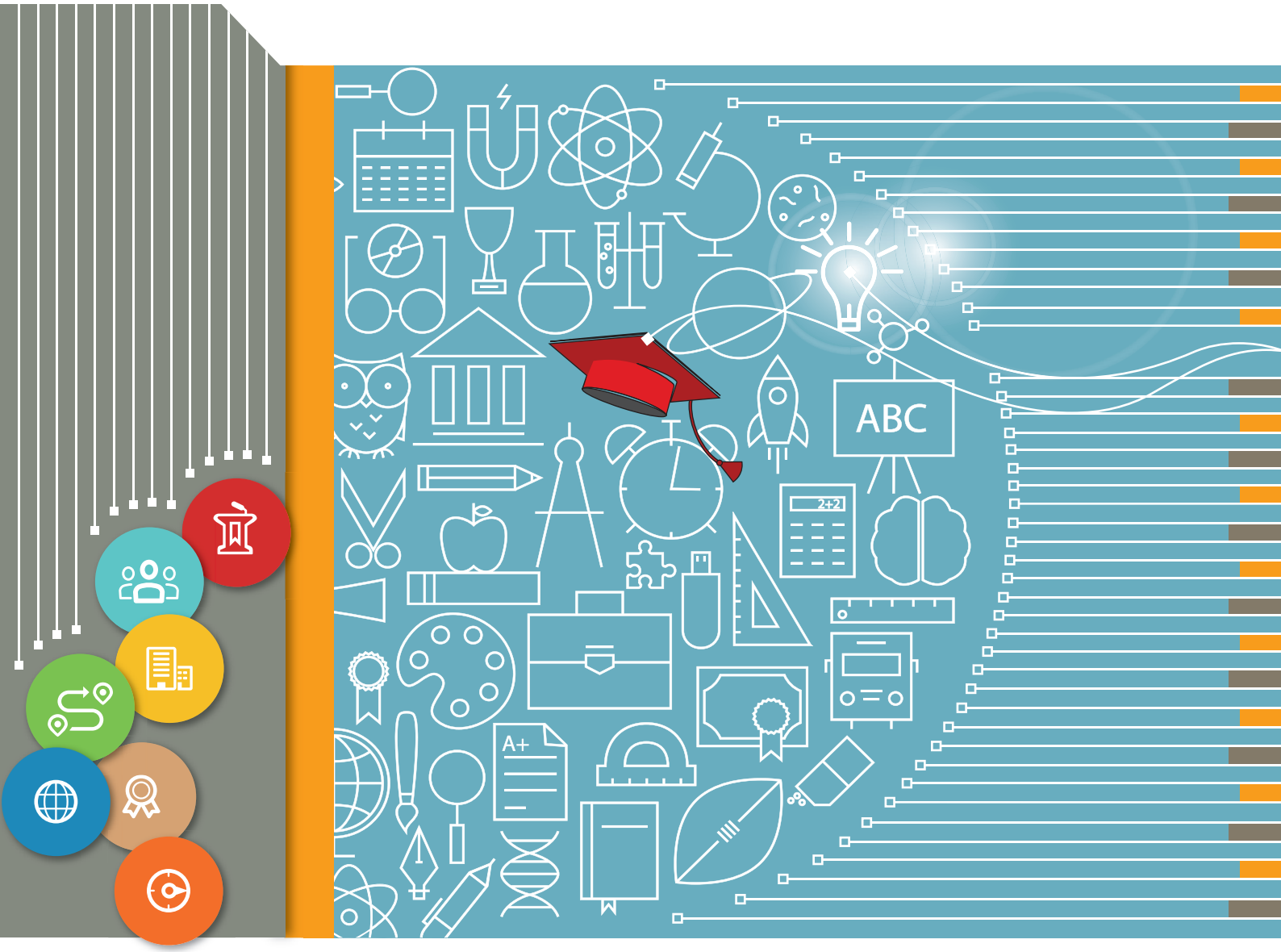
OECD Skills Studies

Supporting Entrepreneurship and Innovation in Higher Education in Poland



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Foreword

Higher education institutions (HEIs) play a critical role in our societies. They provide the high-level skills needed for the modern economy, assist talented young people to transition into employment, generate and disseminate knowledge and innovation, and work together with business, government and civil society to promote economic and social development. However, to reach their full potential, HEIs must constantly improve their organisational approaches, research activities, teaching methods and external engagement practices. Priorities include integrating new teaching methods into the curriculum, developing educational approaches to stimulate entrepreneurial mind sets, providing support to start-up entrepreneurs, strengthening knowledge exchange and innovation collaboration with business, and taking a more international approach to HEI activities. This report examines how to strengthen HEI strategies and practices and government supporting frameworks in this light.

The report forms part of the joint HEInnovate initiative of the European Commission and the Organisation for Economic Co-operation and Development. HEInnovate offers a guiding framework for governments and higher education institutions interested in stimulating innovation and entrepreneurship. It includes an online self-assessment tool (www.heinnovate.eu) in 24 languages covering seven dimensions of the "entrepreneurial university". The tool can be used by stakeholders from within and across HEIs to organise participatory stock-taking exercises to review achievements and identify areas for improvement. HEInnovate also includes a series of country reviews with interested governments and government agencies to support change at higher education system level and identify good practices that are often beneath the radar of policy makers and HEI leaders. Poland is one of the countries to participate in the HEInnovate country review series.

Entrepreneurship and innovation already feature as important parts of the strategic agendas of many Polish HEIs, where senior managers are commonly charged with responsibilities for entrepreneurship education, business support and business engagement. Polish higher education also has a range of funding schemes and entrepreneurial activities in place such as the business incubator network of the Academic Incubator Programme, and the strong involvement of student research clubs in entrepreneurship engagement. At the same time, the review highlights a need to legitimise entrepreneurship as an academic field, engage more professors in the entrepreneurial agenda, use more active methods of teaching and learning for entrepreneurship education, increase business start-up support for students with high-potential projects and create learning networks for entrepreneurship staff in Polish higher education.

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This report was prepared by David Halabisky, 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 Frank Janssen of the Université catholique de Louvain (Belgium) and Pedro Saraiva of the University of Coimbra (Portugal). The report also draws on a background report by Marcin Forkiewicz of the Gdansk University of Technology (GUT).

A key source of information for this report were study visits to Gdansk, Elblag, Lublin, and Warsaw, where meetings were held with relevant national ministries and agencies, regional and local governments, business incubators and science parks and representatives of the following seven universities: University of Gdansk (UG), Gdansk University of Technology (GUT), The State University of Applied Sciences in Elblag (PWSZ), Maria Curie-Sklodowska University (UMCS, in Lublin), Warsaw School of Economics (SGH), Warsaw University of Technology (WUT) and Kozminski University (KU). These study visits were organised by Marcin Forkiewicz, with assistance from Marcin Zieliński (UG), Damian Kuźniewski (GUT), Lukasz Zoledziewski (PWSZ), Dagmara Kociuba (UMCS), Marcin Wojtysiak-Kotlarski (SGH), Krzysztof Raszplewicz (WUT) and Izabela Koładkiewicz (KU). 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 and non-public higher education institutions in Poland and a student survey at the seven universities that participated in the study visits. These online surveys were developed and programmed by Andrea-Rosaline Hofer and Joseph Tixier of the OECD Centre for Entrepreneurship, SMEs, Local Development and Tourism.

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Abbreviations and acronyms

AIP	Academic Entrepreneurship Incubators
DG EAC	Directorate General for Education and Culture of the European Commission
EC	European Commission
ECTS	European Credit Transfer and Accumulation System
GUT	Gdansk University of Technology
HEI	Higher education institution
IT	Information technology
KU	Kozminski University
LEED	Local Economic and Employment Development Programme of the OECD
NCBiR	National Centre for Research and Development (*Narodowe Centrum Badań i Rozwoju*)
NGO	Non-governmental organisations
NQF for HE	National Qualification Framework for Higher Education
OECD	Organisation for Economic Co-operation and Development
PARP	Polish Agency for Enterprise Development (*Polska Agencja Rozwoju Przedsiębiorczość*)
PKA	Polish Accreditation Committee (*Polska Komisja Akredytacyjna*)
PWSZ	State University of Applied Science in Elblag
RIS3	Regional Innovation Strategy for Smart Specialisation
SEIPA	Education Network of Academic Innovative Entrepreneurship (led by KU Kozminski University)
SGH	Warsaw School of Economics
SMEs	Small and medium-sized enterprises
UMCS	Maria Curie-Sklodowska University
UG	University of Gdansk
WUT	Warsaw University of Technology

Executive summary

Study context

Higher education is changing across European Union and OECD countries and there is a growing expectation from governments and society that higher education institutions (HEIs) should evolve into a new type of economic actor. These "entrepreneurial" HEIs are expected to prepare students to be more entrepreneurial and leverage their knowledge generation capabilities to make stronger contributions to economic development in partnership with industry and government.

This review examines the extent to which HEIs in Poland are progressing towards becoming entrepreneurial HEIs. This project is a collaboration between the Organisation for Economic Co-operation and Development (OECD), the European Commission, the Ministry of Science and Higher Education and the Polish Accreditation Committee (PKA) and it aims to identify i) good practices in Poland that could be transferred to other institutions inside, and outside, of Poland and ii) areas where the relevant policy frameworks and HEI practices could be improved. Recommendations and good practice models are included in this report. The review methodology applied the HEInnovate framework to the Polish higher education system and included a survey of HEIs, a student survey and two OECD-led study visits with a team of international experts to Warsaw, Gdansk, Elblag and Lublin to meet with representatives from seven HEIs and their key stakeholders.

Key findings

A wide variety of activities related to innovation and entrepreneurship is taking place in many Polish HEIs, supported by a number of dedicated units and centres. Many of these activities are quite new and enjoy support from HEI leaders who appear to have a keen interest in strengthening ties with the business community and preparing students for a changing labour market. The take-up and growth of these activities over a the past decade is encouraging but requires continued commitment and investment from the HEIs and the government so that the units and centres (e.g. knowledge transfer centres, career offices, special purpose vehicles for spin-outs) can fulfil their mandates and meet the needs of researchers, students and businesses. Funding to date has been heavily reliant on operational programmes supported by European Union Structural Funds, which are only available for limited time periods. This presents a challenge when trying to build sustainable initiatives. For example, the successful Top 500 Innovators Programme for young researchers and knowledge transfer officers ended with limited follow-up at the end of the last European Union Structural Fund programming period (the focus of the follow-up programme is employees in enterprises). Nonetheless, innovation and entrepreneurship are key pillars in the strategies and plans of many HEIs.

Entrepreneurship education is offered in most HEIs and in most departments and faculties. Courses to encourage entrepreneurial mind sets and behaviours in students are also spreading, although they could become more interdisciplinary. The use of practice-based learning for entrepreneurship education (e.g. living labs, the use of case studies, games and simulation) is increasing, but not generalised yet. These changes are led by a small number of enthusiastic academic staff and they are in need of more support and training in creating new curricula related to entrepreneurship.

Extra-curricular learning opportunities have become an important complementary, if not dominant, part of the entrepreneurship teaching and learning provision. For example, student enterprise clubs are a very popular and an important part of student life and education in Poland. Many of these clubs have developed entrepreneurial activities or are centred on entrepreneurship. Business plan competitions are also an important part of the extra-curricular opportunities.

Business start-up support for students is typically built around a network of Academic Business Incubators (AIP) operated by the AIP Foundation. The Foundation has agreements to operate the incubators in 56 HEIs. These incubators provide students with an opportunity to launch their idea and receive basic start-up supports. The incubators are well-known and appear to be operating near capacity. For more intensive supports, students are often referred to off-campus services by the incubators and career offices, but this part of the support system is less developed. For academic staff, the existing supports include technology transfer offices and special purpose vehicles for creating start-ups to commercialise research. These supports are generally strong but the number of spin-out companies using these services is quite low.

Many HEIs appear to be involved in active partnerships and knowledge exchanges with the business community, as well as with local government and regional development agencies. However, these relationships are often reliant on personal relationships rather than strong institutional linkages. There is therefore a risk that these partnerships will weaken or stop when the individuals involved move on. There is a need to make these linkages deeper and more systemic. The new joint research and innovation funding approach (i.e. Regional Research and Innovation Strategies for Smart Specialisation) that requires HEIs to partner with industry, public administration and society holds promise for strengthening the role of HEIs in regional economic development.

Despite these reasonably strong connections with the local community, the Polish higher education system is generally not very international. The number of international students is increasing but remains very low and most international students come from neighbouring countries. Similarly, there are few international academic staff and very few international visiting professors. However, there is a small, but growing, number of international research projects with HEIs outside of Poland and multinational companies. These can be used to help HEIs become more international.

HEIs are generally aware of their entrepreneurship activities and frequently track the number of participants in courses and other basic input metrics. However, more sophisticated monitoring and evaluation techniques do not appear to be used to measure and understand the impact of entrepreneurship and innovation activities. This is a substantial hindrance to HEIs understanding their strengths in entrepreneurship support and building on them.

Key recommendations

For the Ministry of Science and Higher Education

- Build a resource base for entrepreneurship education and training, including platforms for good practice exchange and networks of entrepreneurship professors and entrepreneurs who can contribute to entrepreneurial learning.
- Increase the legitimacy of entrepreneurship as an academic field by funding research and organising Polish entrepreneurship conferences and exchange platforms to encourage academic staff to engage in the entrepreneurial agenda.
- Encourage the newly established Innovation Council to work with HEIs to define an entrepreneurial vision for the Polish higher education system and to oversee its implementation.
- Co-operate with the Ministry of Economic Development (and the Polish Agency for Enterprise Development) to strengthen the start-up support infrastructure using European Union Structural and Investment Funds.
- Develop a new international exchange programme for academic staff to build on the experiences of the Top 500 Innovators Programme, and strengthen animation of the existing network for past programme participants.

For higher education institutions

- Appoint a senior manager in each HEI with responsibility for the "third mission", including innovation, entrepreneurship and building relationships with government and the business community.
- Incorporate a strong entrepreneurial element in advisory boards at the HEI and faculty levels.
- Encourage and support the participation of academic staff in international entrepreneurship networks and conferences.
- Use more active methods of teaching and learning in entrepreneurship education and training.
- Increase the interdisciplinarity of entrepreneurship education.
- Develop more intensive business start-up support for students with high-potential ideas.

Reader's guide

This reader's guide provides information on the HEInnovate conceptual framework and online tool. It also provides methodological information on the Polish HEInnovate country review underpinning this report, including information on the study visits, surveys and other key activities. It concludes with a roadmap for the report.

The HEInnovate framework

Conceptual framework

This review is based on the conceptual framework that underlies the HEInnovate online self-assessment and guidance tool. The framework 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 to the development of this framework was a network of innovation and entrepreneurship professors and experts from across European Union countries.

HEInnovate is based around the following seven pillars of good practice (please refer to the Annex for the full HEInnovate framework and good practice statements):

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 Impact.

HEInnovate online tool

HEInnovate includes an online self-assessment tool that HEIs can use to reflect on their current practices and look for inspiration for change. The HEInnovate online tool aims to promote peer learning and organisational development in HEIs and can be applied to all types of higher education institutions (general universities, university colleges, applied sciences universities, etc.).

One of the main elements of the online tool is a self-assessment tool, which guides users through the set of good practice statements in each of the seven pillars. Users assign a score for their institution (or faculty) for each good practice statement according to the scoring criteria. Then users are directed to guidance notes, case studies and other reference material based on their scoring.

In addition, the tool contains guidance material and case study examples that demonstrate actions that HEIs can take to advance their entrepreneurial agenda.

The OECD-European Union internet tool is available at *http://heinnovate.eu*.

HEInnovate country reviews

The HEInnovate framework is also applied in policy reviews at the regional and country levels. The objective of these reviews is to provide independent assessment of each of the pillars in the framework, identifying areas of strength and areas for improvement.

Recommendations are made for policy actions that can be implemented by national and sub-national governments, as well as for actions that HEIs can take to advance towards becoming more entrepreneurial and innovative universities.

To date, OECD-European Union HEInnovate country reviews have been undertaken in Bulgaria, Ireland, Poland, Hungary and the Netherlands.

HEInnovate review method

The HEInnovate country reviews follow a common methodology. This section explains the steps taken in the case of Poland. The review in Poland was undertaken in collaboration with the Ministry of Science and Higher Education and the Polish Accreditation Committee (PKA).

1. Selection of case study HEIs

The selection of HEIs to be covered in the study visits was undertaken by the OECD, the European Commission, the Polish Accreditation Committee (PKA) and the Ministry of Science and Higher Education. Several factors were considered during the selection of HEIs, including type of institution (i.e. public or non-public); academic focus (e.g. general university, applied sciences university, etc.), size (e.g. number of students), location (e.g. rural, urban) and region (i.e. voivodshop). Considering these factors, the following HEIs were invited to participate in the study visits, and each institution agreed to participate:

i) GUT Gdansk University of Technology
ii) KU Kozminski University
iii) UMCS Maria Curie–Sklodowska University
iv) PWSZ State University of Applied Science in Elblag
v) UG University of Gdansk
vi) SGH Warsaw School of Economics
vii) WUT Warsaw University of Technology

Following the agreement of participation by these HEIs, the OECD made a presentation on the HEInnovate tool and the Polish HEInnovate country review at the Conference of Rectors of Academic Schools in Poland (CRASP) on 16 October 2015 in Wroclaw. The purpose of this presentation was to increase awareness about HEInnovate and to inform the Rectors about the review.

2. Background report

A report was prepared to assist in project planning. This report contains information on the Polish higher education system, as well as discussion on current trends in Polish higher education. It also contains profiles of the HEIs and regions that were included in the study visit. Material from the background report has been integrated into this report.

3. Kick-off workshop

A kick-off workshop for the project was held in Warsaw on 16 November 2015. It was organised by the OECD and European Commission, and hosted by the Ministry of Science and Higher Education. Representatives of each of the seven HEIs selected for the study visits attended, as well as representatives from PKA.

The purpose of the workshop was to familiarise the participants with the HEInnovate tool and framework, and to provide information on the country-level review. The OECD presented the HEInnovate review methodology and outlined the expectations for participating HEIs. The European Commission made a presentation of the HEInnovate tool and explained how the HEIs could use and benefit from it. There was also some discussion on the Polish context and the background report.

4. *HEI Leader Survey*

An online survey of HEI leaders was used to complement the information obtained in the background report and study visits. The survey was sent to all 434 public and non-public HEIs. The survey was conducted in English and was open for completion between 20 November 2015 and 11 March 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.

A total of 39 HEIs completed the survey, including all seven of the case study HEIs. Of the 39 completed surveys, 28 were from public HEIs and 11 were from non-public HEIs. Results of this survey are reported throughout this report.

5. *Study visits*

An international review team, led by the OECD Secretariat, completed two 4-day study visits to Poland. The first study visit was to Warsaw, Gdansk and Elblag and occurred on 12-15 January 2016, while the second visit to Warsaw and Lublin was from 29 February to 3 March 2016.

During the two visits, the international review team visited the seven case study HEIs to meet with Rectors and/or Vice-Rectors, Deans, Professors, career offices, technology transfer offices, business incubators, student associations, student and staff start-up companies, students taking entrepreneurship courses and university alumni. Information on challenges in the current approach to graduate entrepreneurship support and opportunities for improvement was systematically gathered through a series of individual interviews, focus groups and roundtable meetings. In addition, meetings were also held with the following HEI stakeholders:

- Ministry of Science and Higher Education
- Polish Accreditation Committee
- National Centre for Research and Development in Poland
- Polish Agency for Enterprise Development
- Academic Entrepreneurship Incubators (AIP) at GUT Gdansk University of Technology, UG University of Gdansk, PWSZ The State University of Applied Sciences in Elblag, SGH Warsaw School of Economics, UMCS Maria Curie-Sklodowska University and KU Kozminski University
- Chambers of Commerce: *Pracodawcy Pomorza* and *Regionalna Izba Gospodarcza Pomorza*
- Marshal Offices of Pomorskie Voivodship, Lublin Voivodship and Warsaw

- Vice Mayor, Municipal Council in Elblag
- Elblag Technology Park
- OPEGIEKA (a private company in Elblag and university partner)
- Elblag Europa (non-government organisation in Elblag and university partner)
- Lublin Science and Technology Park
- Ecotech-Complex
- Economic Development Office of the City of Warsaw
- GrowPoint Business Accelerator at KU Kozminski University

6. Online student survey

An online survey was also administered to students at the case study HEIs in English and Polish. The questionnaire collected information on the levels of participation in entrepreneurship training programmes, levels of satisfaction and impacts on their entrepreneurial intentions.

The survey was open from 15 April 2016 to 25 May 2016. Overall, 2 298 students participated in the survey from the WUT Warsaw University of Technology (166 responses); KU Kozminski University (157); SGH Warsaw School of Economics (298); UMCS Maria Curie-Sklodowska University (177); PWSZ The State University of Applied Sciences in Elblag (102); GUT Gdansk University of Technology (143); and UG University of Gdansk (1 196). There were 59 responses from students who did not identify their university.

7. Report and workshop

The OECD Secretariat prepared this report with inputs from the international review team and the local project co-ordinator. The analysis draws on information gathered during the study visits and from the two online surveys. A draft of this report was circulated for comment to the Ministry of Science and Higher Education, PKA, the European Commission and representatives of the case study universities.

Further, the OECD Secretariat and the international expert team presented the draft report at an interactive workshop in Warsaw on 12 July 2016. The workshop was attended by the Ministry of Science and Higher Education, PKA, the European Commission and representatives of the case study HEIs. The workshop was used to discuss and refine the draft report's findings and recommendations.

Following the workshop, the OECD Secretariat finalised the report, taking into account written feedback and contributions made in the workshop.

A roadmap for this report

This report begins with an introductory chapter that provides key contextual information for this national review. Chapter 1 provides a brief discussion on the importance of supporting entrepreneurship in higher education, as well as a description of the higher education system in Poland, including its governance structure. It also describes and presents trends related the key actors involved, including HEIs, students and academic staff, and relevant national Ministries and agencies. The first chapter concludes with a brief profile of the case study HEIs.

Chapter 2 presents an assessment of the national higher education system in Poland based on the HEInnovate framework. This assessment covers all seven dimensions of the

framework and includes results from the HEI Leader Survey and Student Survey as well as the case study visits.

Chapters 3, 4 and 5 provide a more in-depth analysis on three pillars of the HEInnovate framework: Leadership and Governance (Chapter 3); Entrepreneurial Teaching and Learning (Chapter 4); and Preparing and Supporting Entrepreneurs (Chapter 5). These chapters present an overview of the current state of play in Poland, highlighting good practices and identifying areas for improvement. Recommendations are made in each chapter and international learning models are presented to illustrate concrete actions that can be taken to address gaps and areas for improvement.

Chapter 1

Overview of the Polish higher education system

This chapter provides contextual information for the HEInnovate review. It begins with a discussion of entrepreneurship and higher education in Poland, followed by a brief overview of the current policy framework for promoting innovation in Poland. The bulk of the chapter provides an overview of the Polish higher education system and the main actors involved. The chapter concludes with a brief overview of the higher education institutions that participated in the study visits and an overview of their cities and regions.

1.1. Entrepreneurship and higher education

Entrepreneurship is a concept for which there is no single definition. More than one hundred definitions are currently in use. Two common elements that thread through nearly all of the definitions are the notions of innovation and value-creation.

Within complex organisations such as higher education institutions (HEIs) and their networked environments, entrepreneurship can be a process to promote development through the ability to identify and react to opportunities. As such, entrepreneurship has a long-standing presence in higher education reform initiatives that promote, for example, the systematic crossing of discipline and knowledge boundaries in teaching and research, and engaging external stakeholders in an institution's leadership and organisational capacity.

In entrepreneurial HEIs, teaching, research, and societal engagement are intertwined and the institution's leadership and governance models ensure a synergy across these areas and with non-university stakeholders. Gibb (2013) offers a useful working definition of the entrepreneurial higher education institution that can be applied to different types of institutions in different contexts:

> "Entrepreneurial higher education institutions are designed to empower staff and students to demonstrate enterprise, innovation and creativity in research, teaching and pursuit and use of knowledge across boundaries. They contribute effectively to the enhancement of learning in a societal environment characterised by high levels of uncertainty and complexity and they are dedicated to creating public value via a process of open engagement, mutual learning, discovery and exchange with all stakeholders in society – local, national and international."

There are many motivations for higher education institutions to become entrepreneurial. For example, becoming more entrepreneurial can help HEIs catch up with the changes in how knowledge is produced since knowledge generation and application increasingly occurs across disciplines and outside of HEIs. It can help HEIs re-organise education so that students and academic staff can cope with the volume of information that is generated and easily accessed through the internet. Moreover, it can also help students be better prepared for the labour market as employees or in self-employment by helping them to be more entrepreneurial individuals through education programmes that emphasise soft skills such as problem solving, team-work and communication. It can also help with promoting and supporting business start-ups, which will contribute to economic development and job creation. Becoming entrepreneurial will also make HEIs more relevant to the community by making research more accessible and increasingly working with businesses to apply academic work to business challenges.

At the same time, there are many barriers to advancing this agenda. HEIs are multi-faceted, complex environments with mixed autonomous groups and cultures. This results in different work organisations within single institutions. This is further complicated by the presence of different types of stakeholders and partnerships with different stakeholder groups. Consequently, the concept of entrepreneurship has a different meaning for different

individuals and groups within a university. Therefore institutions will need to define what entrepreneurship means within their context and launch a dialogue on how entrepreneurship applies to their range of activities. Advancing in this agenda will likely require governance models to become more lateral rather than hierarchical. It also means that entrepreneurship and innovation must be conceptualised as being on an equal plane with research and education objectives. Thus the third mission will need to be taken as a core academic mission rather than as a peripheral academic task.

1.2. Supporting the Polish innovation agenda

Poland generally compares poorly relative to other European Union countries on many innovation measures. For example, the European Union's Innovation Union Scoreboard (European Commission, 2015) ranks Poland 24th out of the 28 Member States on the overall aggregate indicator. The Scoreboard suggests that policy makers should aim to boost performance in the following areas:

- Number of international PhD students in Poland from outside the European Union;
- Number of public-private scientific joint publications;
- Licensing and patent revenues coming from abroad;
- Number of international patent applications related with societal challenges.

In response to this longstanding challenge, the Government has prioritised strengthening the research and innovation system to ensure synergies between research and development (R&D) and innovation activities. The current innovation agenda is based largely on the 2013 Strategy for Innovation and Effectiveness of the Economy 2020, which defines the key research and innovation priorities. The 2014 Enterprise Development Programme implements the 2013 Strategy with a wide range of measures that enhance the innovation support system over the range of the innovation cycle. These two strategic documents, along with the National Research Programme, underpin Poland's Smart Specialisation Strategy. The Smart Specialisation Strategy is supported with Operating Programmes under the European Regional Development Fund (ERDF).

The Smart Specialisation Strategy is reinforced with other strategies and programmes. One of the most relevant for higher education is the Operational Programme – Smart Growth, which is one of Poland's six national programmes that align with Europe 2020 goals. This programme aims to strengthen research activity and improve linkages between scientific research and the business community across all regions. There is a special focus on enhancing the capacity of private sector companies, mainly of small and medium-sized enterprises, to be more innovative and to have access to scientific research. The programme includes EUR 10 billion of investments, of which EUR 8.6 billion comes from the ERDF. It is expected to support more than 12 000 enterprises in conducting research, resulting in 20 500 new jobs by the end of 2023.

A number of other specific actions have been taken towards strengthening support for innovation. For example, "Innovation for the economy" is a set of new measures aimed at connecting research with business by increasing the amount of financial support that is available with revolving instruments (e.g. loans, venture capital investments). New financial instruments include the Bridge Venture Capital Programme (PLN 2 billion or approximately EUR 0.46 billion) and the Vitello Programme (PLN 500 million or approximately EUR 115 million). In addition, this set of measures will also adjust the methods of distributing funding used by The National Centre for Research and Development, including through a simplification of rules

and an acceleration of procedures. Funding will focus on projects that create technical solutions to challenging problems, with a priority on transferring innovations.

The Ministry of Economic Development also adopted the Responsible Development Plan in February 2016, which aims to boost innovation by improving i) regulation related to innovation, ii) the business environment (including tax system) and iii) linkages between business and science. It will also create a new law on innovativeness. This plan is elaborated in the Strategy for Responsible Development (*Strategia na rzecz Odpowiedzialnego Rozwoju*), which was launched in May 2017.

Further, the Ministry of Science and Higher Education plans to redesign the structure of research institutes. The new approach will build on the concept of the National Institute of Technology, which concentrates on the transfer of technologies to the Polish economy. At the same time the National Institute of Technology will conduct research to support the governments in developing policies in areas such as energy, climate change and defence. This will be complemented by a series of activities that aim to extend the social responsibility of science and academic institutions, including the development of National Science Congress, Children's and Third Age Universities and Mobile Copernicus Centres.

One of the most important recent actions was the establishment of The Innovation Council by the Prime Minister on 18 January 2016. The Council is the most important co-ordinator of innovation policy and it has been anchored in the public administration system. The Deputy Prime Minister – Minister of Economic Development was appointed as the Chairman of the Council and permanent members of the Council are: the Minister of Science and Higher Education; the Minister of Culture and National Heritage; the Minister of Digital Affairs; the Minister of Treasury; the Minister of Health; the Minister of National Education; and the Undersecretary of State in Ministry of Economic Development who acts as Secretary of the Council. The main tasks of the Council are to:

- co-ordinate activities related to strengthening of innovation in the Polish scientific community and economy;
- identify future directions innovation policy and develop proposals for the government;
- evaluate innovation activities; and
- conduct public consultation of the main lines of action.

The Innovation Council has already developed proposals for legislative changes ("Small Law on Innovation"), including a draft law that aims to facilitate innovation with significant changes to the design of R&D tax credits (e.g. increasing their size, adding new eligible cost categories, expanding the deduction period) and offering additional incentives for start-ups and companies that consistently increase their R&D expenditures. In addition, a "White Paper on innovation" was adopted in September 2016, which contains a catalogue of barriers or regulations requiring amendments and development of Polish innovativeness. The white paper will lead to a "large act on innovation", which will be elaborated before the end of 2016.

A subsidiary body of the Council – the Innovation Committee – is a working-level committee that consists of deputy ministers from the ministries that are represented on the Council and also from the Ministry of Finance, the Ministry of National Defence and the Ministry of the Environment. The Committee draws up detailed proposals aimed at increasing the innovativeness of Polish economy and removing barriers that hampers innovation.

1.3. Polish higher education

Governance of higher education

The national system of higher education in Poland is centrally organised, but all HEIs operate autonomously within this legal framework. The six key pieces of legislation in this framework are the following, with the Law on Higher Education being the principal law that governs higher education:

1. The Law on Higher Education (27 July 2005, with further amendments);
2. The Act on the Academic Title and Academic Degrees (14 March 2003, with further amendments);
3. The Act on the National Centre for Research and Development (2010, with further amendments);
4. The Act on the National Science Centre (2010, with further amendments);
5. The Act on the Principles of Financing Science (30 April 2010, with further amendments); and
6. The Act on Loans and Credits for Students (1998, with further amendments).

An important element of the system is the National Qualifications Framework for Higher Education (NQF for HE) (*Krajowe Ramy Kwalifikacji dla Szkolnictwa Wyższego*). The NQF for HE was developed for all levels of education (i.e. not only higher education); first and second cycle degrees correspond to Levels 6 and 7 of the European Qualifications Framework, while third cycle degrees correspond to Level 8. The learning outcomes are specific to each level and include a) knowledge, b) skills and c) attitudes. Entrepreneurship is included in the NQF for HE as personal and social competences for Levels 6-7 and many study programmes make specific references to entrepreneurship in their learning outcomes, e.g. engineering graduates need to be able to "think and act independently, be creative and entrepreneurial".

The Law on Higher Education includes provisions on a national system of tracking graduates' employment outcomes based on administrative data from the social security system. The outcomes of the first edition of tracking graduates' career path were published in May 2016 and are available at: *http://absolwenci.nauka.gov.pl/*. Three types of reports are created corresponding to three levels of analysis: field of study, higher education institution and a national report. The tracking of employment outcomes is done with data contained in the ministerial students' database (POL-on) combined with data collected by the Social Insurance Institution (ZUS). The new tracking system aims to inform public opinion, potential students, public authorities and other relevant stakeholders with impartial and comparable data on graduates' outcomes in the labour market, including employment status, salaries, length of job search and more. At the same time complementary tracking activities are carried out by HEIs themselves as a tool of internal quality assurance in order to gather qualitative data, e.g. graduates opinion on curriculum.

The Ministry has recently announced several reforms and new initiatives to strengthen the higher education framework. At the end of February 2016, the Ministry of Science and Higher Education announced the "Law 2.0 competition", which aims to reform the Law on Higher Education. Three teams, selected from the academic community, are preparing three competing concepts for the new law. These will be the starting point for a series of conferences (launched in October 2016) that will constitute the National Congress of Science. Over the course of the debates, the law will be drafted and it is expected to come into force

for the academic year 2018-19. The Law 2.0 will bring broad reform, making the higher education and research system more efficient and closer to the needs of society and the economy. The new law will also introduce new types of research universities and mechanisms for financing and evaluating the performance of research organisations. It should also stimulate the co-operation with entrepreneurs and strengthen the internationalisation of the higher education system, including through scholarships for foreign students that will be managed through the National Agency of Academic Exchange.

Furthermore, a new strategy for science and higher education was announced in September 2016. The proposal for reforms consists of three pillars: a Constitution for Science to bring about systemic changes in the higher education; Innovation for the economy initiative, with a focus on the commercialisation of research and science-business partnerships; and the Science for You initiative to promote social responsibility for science. The first element of the Constitution for Science is a Deregulation Act which applies from the beginning of October 2016. The aim of the new law is to reduce bureaucracy in science and higher education management by introducing deregulation in various areas for universities. The criteria of a programme assessment carried out by the Polish Accreditation Committee have been changed in order to focus strictly on the quality of an educational process and learning outcomes and eliminate bureaucratic burden.

In addition, there are ongoing consultations on a draft of a new version of the Law on Academic Degrees and Titles and on Degrees and Title in Art (*Ustawa o Stopniach Naukowych i Tytule Naukowym oraz o Stopniach i Tytule w Zakresie Sztuki*), which assumes that co-operation with business might be a criterion in researchers' careers (industrial doctorate). The new formula of financing of higher education institutions is currently being elaborated by the Ministry of Science and Higher Education.

Structure of higher education in Poland

The Polish higher education system conforms to the guidelines from the Bologna Process in European Higher Education Area. The degree system based on a three-cycle structure has been implemented with the European Credit Transfer and Accumulation System (ECTS).

First cycle

First-cycle studies (3 to 4 years) lead to the professional title of a *licencjat* or *inżynier*. This is the Polish equivalent of the Bachelor's degree. It is focused on preparing students for future employment or for continued education within the Master's degree programmes. To obtain this degree, students must earn 180-240 ECTS credits.

Second cycle

Second-cycle studies (1.5 to 2 years) follow the completion of first cycle studies and lead to the professional title of *magister*, or an equivalent degree depending on the study course profile. This is the equivalent of a Master's degree. Master's degree holders may enter a doctoral programme (third-cycle studies). To obtain the second cycle degree, students must earn 90-120 ECTS credits.

Long-cycle studies

In addition to the standard first and second cycle studies, higher education institutions offer long-cycle programmes (4.5 to 6 years). They are however provided only in selected

fields of study such as medicine, pharmacy, veterinary medicine, dentistry, theology, law and some art and design areas.

Long-cycle studies lead to the professional title of *magister*, or an equivalent degree depending on the study course profile, which is also the equivalent of a Master's degree. To obtain this degree, students must earn 270-360 ECTS credits.

Non-degree postgraduate studies

Postgraduate studies include all programmes other than degree programmes or doctoral programmes. They are designed for people who already hold higher education diplomas. These programmes usually last for 1 or 2 years and students must earn a minimum of 30 ECTS credits.

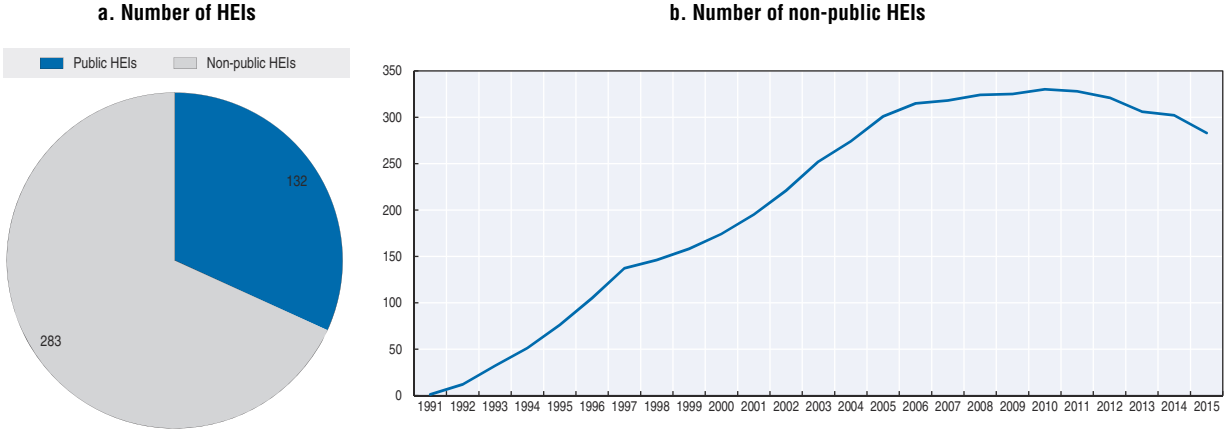
Third cycle

Third-cycle studies (up to 4 years) lead to a PhD degree and are accessible for graduates of a Master's degree programme. Third cycle studies are offered by universities and the Polish Academy of Sciences as well as research institutes. The PhD degree is awarded to candidates who submit and successfully defend a doctoral dissertation before the thesis committee and pass the doctoral examination.

Higher education institutions

There are broadly two types of HEIs in Poland, those that are public and those that are non-public. Public HEIs are state institutions, while non-public institutions are operated by the private sector. In 2015-16, 132 of the 415 HEIs were public HEIs (Figure 1.1a). The first non-public HEIs were established in 1991 and the number increased rapidly to 330 by 2010. Since then, the number of non-public HEIs has declined to 283 (Figure 1.1b).

Figure 1.1. **Public and non-public HEIs, 2015-16**

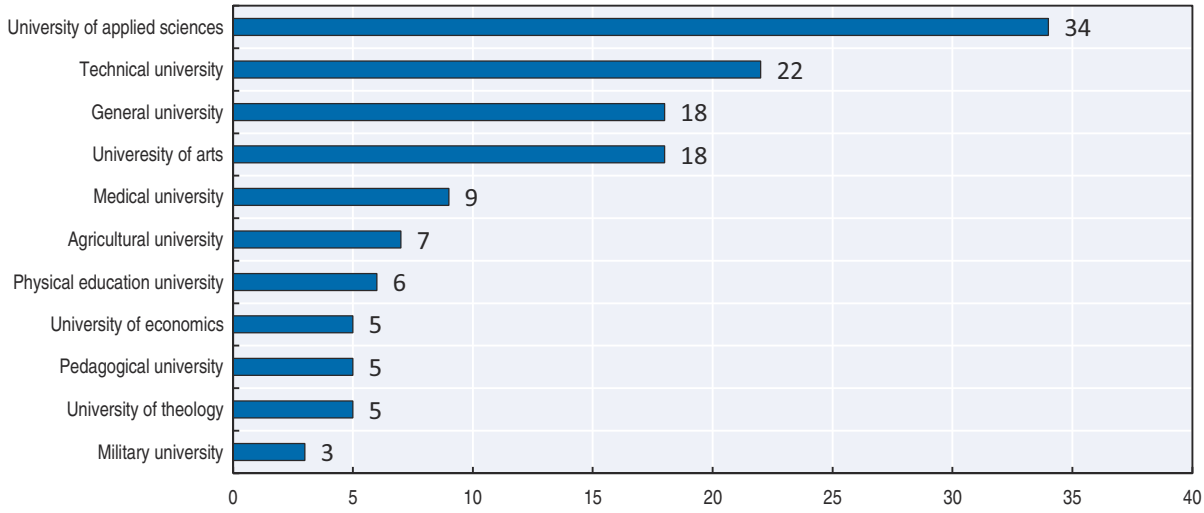


Source: Central Statistical Office of Poland (2016), "Higher Education Institutions and their Finances in 2015-16".

Public HEIs are diversified, including general and specialised universities, as well as universities of applied sciences (Figure 1.2).

Another important distinction between different types of HEIs is *university-type* institutions and *non-university* institutions, which is defined in the Law on Higher Education. This distinction is significant as only university-type institutions are authorised to confer the

Figure 1.2. **Types of public HEIs, 2015-16**



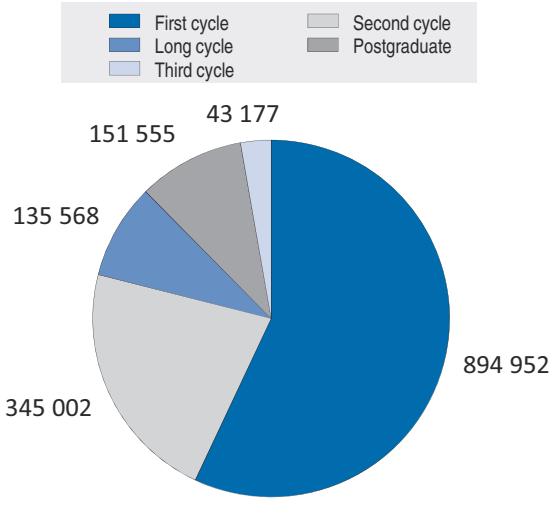
Source: Central Statistical Office of Poland (2016), "Higher Education Institutions and their Finances in 2015-16".

academic degree of Doctor (PhD). As long as at least one unit within the HEI is authorised, the institution is considered to be university-type. Of the 415 HEIs, 118 are university-type and the vast majority of these are public HEIs.

Students

In the academic year 2015-16, there were nearly 1.6 million students in the Polish higher education system. Students in first cycle studies accounted for 57% of students, while second cycle studies accounted for 22% of students (Figure 1.3). Approximately 9% of students were in long cycle programmes and another 9% were in postgraduate programmes. Students in third cycle studies accounted for 3% of the student body.

Figure 1.3. **Students in Polish higher education, 2015-16**



Source: Central Statistical Office of Poland (2016), "Higher Education Institutions and their Finances in 2015-16".

The majority of the students are enrolled in full-time programmes in public HEIs. Students do not pay tuition for these programmes. However, in terms of part-time studies, which are fully paid by the students, non-public HEIs are more popular.

The most popular fields of study for full-time students were Business and administration (124 281 students), Engineering and engineering trades (119 459) and Social sciences (91 879) (Table 1.1). Combined, these three areas of study account for 36.5% of full-time students. These three fields of study were also among the most popular with part-time students, with 44.2% of part-time students studying in these fields. In addition, Teacher training and education science was also very popular with part-time students (55 529 students), as were Health sciences (33 127) and Security services (31 057 students).

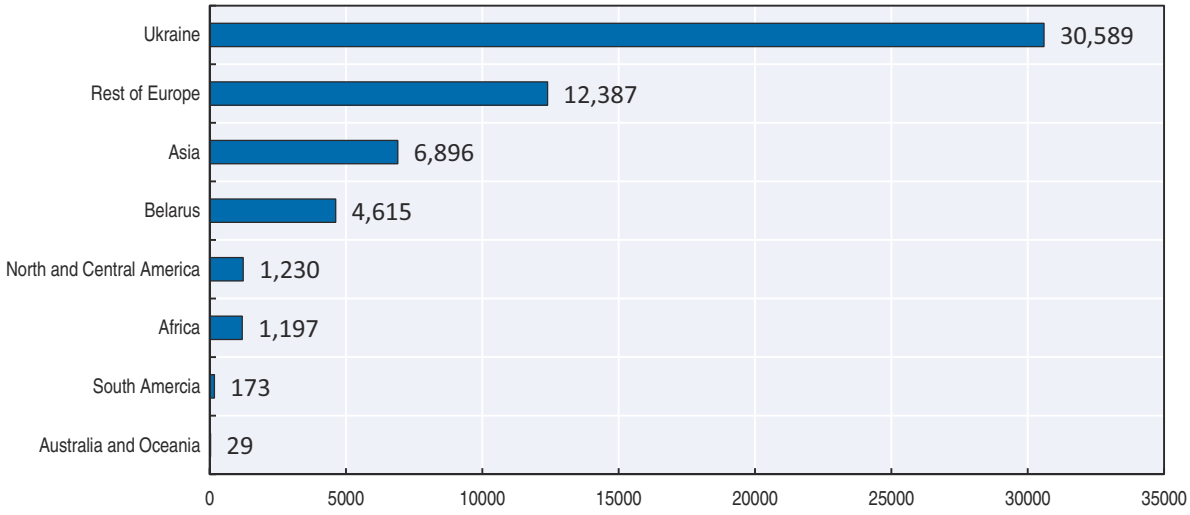
Table 1.1. **Number of students by field of study, 2015-16**

Field of study	Full-time students		Part-time students	
	#	%	#	%
Business and administration	124 281	13.5	137 583	28.3
Engineering and engineering trades	119 459	13.0	32 320	6.6
Social sciences	91 879	10.0	45 158	9.3
Health sciences	90 827	9.9	33 127	6.8
Languages	58 128	6.3	15 168	3.1
Teacher training and education science	57 137	6.2	55 529	11.4
Architecture and building	53 228	5.8	24 014	4.9
Manufacturing and processing	36 033	3.9	14 803	3.0
Information and communication technologies	35 756	3.9	16 214	3.3
Law	30 224	3.3	25 214	5.2
Security services	29 653	3.2	31 057	6.4
Personal services	27 007	2.9	14 133	2.9
Arts	26 438	2.9	7 159	1.5
Physical science	21 851	2.4	732	0.2
Humanities (except languages)	19 615	2.1	3 179	0.7
Life science	15 456	1.7	300	0.1
Journalism and information	12 541	1.4	4 661	1.0
Transport services	11 992	1.3	5 151	1.1
Inter-disciplinary programmes and qualifications involving	11 977	1.3	6 223	1.3
Mathematics and statistics	11 622	1.3	414	0.1
Agriculture	8 882	1.0	4 160	0.9
Environment	7 147	0.8	1 025	0.2
Social services	5 838	0.6	2 260	0.5
Veterinary	4 848	0.5	966	0.2
Forestry	3 047	0.3	2 657	0.5
Hygiene and occupational health services	1 751	0.2	1 225	0.3
Inter-disciplinary programmes and qualifications	2 205	0.2	1 749	0.4
Fisheries	130	0.0	0	0.0
Total	**918 952**		**486 181**	

Source: Central Statistical Office of Poland (2016), "Higher Education Institutions and their Finances in 2015-16".

Although the student base in the Polish higher education system is becoming increasingly international, the number of international students continues to be low relative to most other European Union countries. Out of the nearly 1.6 million students in 2015-16, 57 116 were foreign students (approximately 3%). More than half of these international students were from neighbouring Ukraine (Figure 1.4).

Figure 1.4. **Number of foreign students, 2015-16**



Source: Central Statistical Office of Poland (2016), "Higher Education Institutions and their Finances in 2015-16".

One of the most important issues that the Polish higher education system is facing is a substantial decline in the number of students due to the demographic structure of Poland. After peaking at nearly 2 million students in the years 2002 to 2009, it is expected that the number of students will decline to 1.25 million by 2024. This downward trend will clearly exert pressure on the HEIs as there is likely to be increased competition to attract students.

Staff

There were approximately 164 500 employees in Polish HEIs, with more than half being academic staff (Figure 1.5). The majority of these academic staff and non-teaching employees work in public HEIs (88%).

Figure 1.5. **Number of staff, 2015-16**



Source: Central Statistical Office of Poland (2016), "Higher Education Institutions and their Finances in 2015-16".

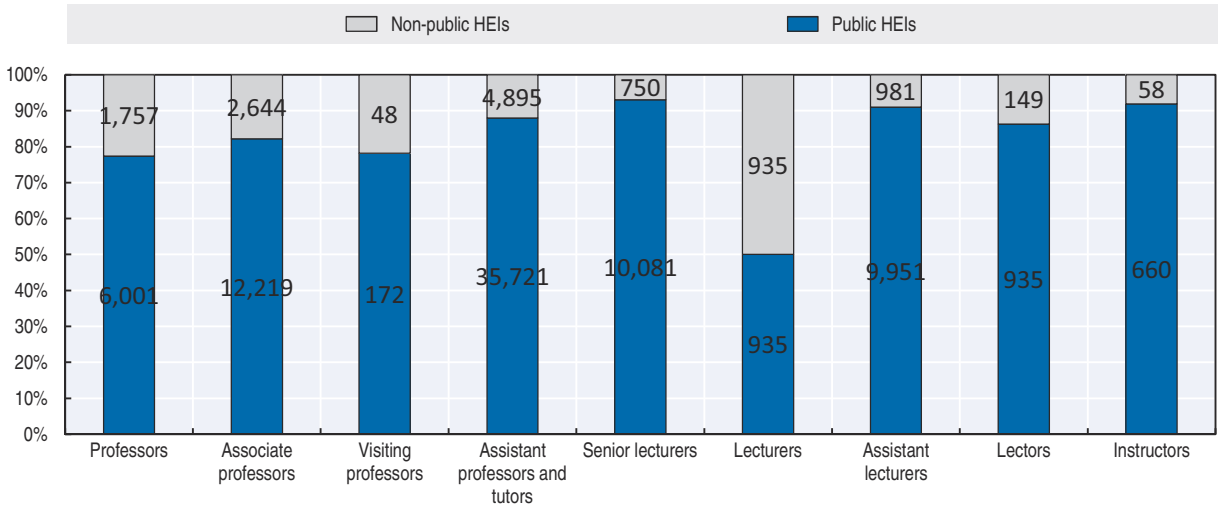
Employment in Polish higher education is determined by the regulations of the Law on Higher Education and there are defined categories of staff. Each category has a set of general requirements:

1. Research and teaching staff (vast majority of the academic staff) and research staff:
   - **Full professor** (*profesor zwyczajny*): may be held by a person with the academic title of *professor* (see Box 1.1).
   - **Associate professor** (*profesor nadzwyczajny*): may be held by a person with the degree of *doktor habilitowany* or the academic title of *profesor*. In HEIs for maritime studies, it may also be held by a person with the degree of *doktor* or the highest naval rank. In some exceptional cases, it may also be held by a person who, while not in compliance with the full requirements, holds the academic degree of *doktor* and has demonstrated outstanding and original achievements in research, professional or artistic activity, attested in accordance with the procedure laid down in the HEI's statutes.
   - **Visiting professor**: may be held by a person with the degree of *doktor habilitowany* or the academic title of *profesor*, employed in another higher education institution. In some cases it may also be held by a person who, while not in compliance with the full requirements, holds the academic degree of *doktor* and has demonstrated outstanding and original achievements in research, professional or artistic activity, attested in accordance with the procedure laid down in the HEI's statutes.
   - **Assistant professor** (*adiunkt*): may be held by a person with at least the academic degree of PhD (*doktor*).
   - **Assistant lecturer** (*asystent*): may be held by a person with at least the degree of MA (*magister*) or equivalent.
2. Teaching (non-research) staff:
   - **Senior lecturer** (*starszy wykładowca*): may be held by a person with at least the degree of MA (*magister*) or equivalent.
   - **Lecturer** (*wykładowca*): may be held by a person with at least the degree of MA (pol. *magister*) or equivalent.
   - **Lector** (*lektor*): usually is held by teachers providing foreign languages classes' may be held by a person with at least the degree of MA (*magister*) or equivalent.
   - **Instructor** (*instruktor*): usually is held by teachers providing physical education classes (obligatory for every study programme at both BA and MA levels); may be held by a person with at least the degree of MA (*magister*) or equivalent.

Within both public and non-public HEIs, most academic staff are Assistant professors (Figure 1.6). One of the main differences in the structure of academic staff in public and non-public HEIs is that public HEIs use Lecturers (including Senior and Assistant lecturers) much more heavily than non-public HEIs. Lectors and Instructors are not used widely in either public or non-public HEIs, and there are also very few Visiting professors.

The Polish legal framework does not put any restrictions concerning the activities undertaken by academic staff members inside or outside of academia. Instead, these issues are usually subject to the internal HEI's policy. The only legal restriction concerning employment is the "minimum core staff" requirement for each specialisation for HEIs to be able to confer degrees.

Figure 1.6. **Number of employees, 2015-16**



Source: Central Statistical Office of Poland (2016), "Higher Education Institutions and their Finances in 2015-16".

Box 1.1. **Academic titles**

There is a unique structure of academic degrees and titles in Poland. Students who successfully complete third cycle studies are typically awarded a PhD, which is an academic degree that is awarded through a separate procedure by the entitled faculties. The granting of this degree does not require any further approval beyond the faculty level. However, other academic titles require additional procedures and approvals:

- **Full professor** (*profesor zwyczajny*) is an academic title. It is the highest academic degree awarded by the President of the Republic of Poland, following approval of the Central Committee for the Academic Degrees and Titles. This Central Committee is a national-level body that is composed of Full professors who serve on the committee for 4-year terms.
- ***Doktor habilitowany*** is an academic degree awarded only by the entitled HEIs' faculties to the outstanding researchers with the PhD degree. This requires a special procedure that reviews the candidate's research outcomes. The procedure of awarding the *doktor habilitowany* degree is complete after its approval by the Central Committee for the Academic Degrees.

1.4. Key actors for supporting entrepreneurship in higher education

Ministry of Science and Higher Education

The Ministry of Science and Higher Education has the primary responsibility in government for matters related to higher education. It is responsible for the Law on Higher Education and designs and implements policies related on science and higher education, including designing European Union-funded programmes. These programmes are implemented through various agencies, including the National Centre for Research and Development (*Narodowe Centrum Badań i Rozwoju*) and the National Science Centre (*Narodowe Centrum Nauki*), and the Ministry remains responsible for monitoring and reporting on these actions.

One of the most important functions of the Ministry is to grant HEIs the authority to confer degrees. This includes monitoring the operations of HEIs to ensure that they are in compliance with the national law and with the statutes of each HEI.

The Ministry manages the budget for higher education and determines funding for each public HEI. It is also responsible for nationally-funded scientific research. It disburses scientific research funds in collaboration with agencies such as the National Science Centre and the National Centre for Research and Development. The Ministry can also assign grants for education and research activities for public HEIs.

Activities for entrepreneurship – Operational Programme Knowledge Education Development (PO WER)

In June 2014, the Government launched "the Competence Development Programme", which replaced the scheme of Commissioned Degree Programmes. The Competence Development Programme was established on the basis of a specific *ex-ante* evaluation, commissioned by the National Centre for Research and Development (NCBiR) and conducted in 2014, aiming at exploring demand for skills in various industries in the coming years in the context of trends in the Polish economy. The Competence Development Programme puts a particularly strong emphasis on co-operation between universities and employers in strengthening the practical elements of training and increasing employer's engagement in the Programme delivery. Its main objective is to strengthen the competences needed to succeed in the labour market, especially transversal ones.

73 projects have been implemented in the framework of a pilot phase of the project (PLN 58.0 million, or approximately EUR 13.3 million). The call concerning the first edition of the Competence Development Programme was launched in May 2015. Examples of other projects under PO WER include:

- **Apprenticeship programme at State Higher Vocational Schools.** The main objective of this project is to develop a nation-wide, single (uniform) system of 6-month apprenticeships in non-university higher education institutions. The project will finance an additional three months of apprenticeship that complement the 3 months of apprenticeship mandatory in practical-profile degree programmes.
- **New Training Programme.** The aim of the competition-based programme is the implementation of training programmes for both general academic or practical profiles, based on analysis and economic forecasting, tailored to the needs of the economy, the labour market and society. The competition aims to distribute funds to finance projects concerning the creation and implementation of new courses, or the adaptation of existing courses, to the current socio-economic needs. Submitted projects must include employers in the preparation and implementation of training programmes. In addition, all projects in the competition for the New Education Programmes must respond to the needs of individual regions, as defined in the Regional Innovation Strategies. A project submitted to the competition therefore must have a positive opinion of the local government confirming the compliance of the planned activities with the Regional Innovation Strategies of the relevant voivodship (regional authority).
- **Studying? Practice!** This competition aims to enhance the quality of student placements organised jointly by employers and HEIs. This programme aims to meet the needs of employers by providing students with experience for future professional work. The scope of the curricula is shaped by the HEIs in co-operation with employers. Business practitioners and employers who are representatives of regional enterprises are also involved in teaching and in assessing its outcomes.

- **Academic Career Offices.** This contest seeks to encourage the expansion of services offered by academic career offices, as well as improving their quality. This applies particularly to the support services related to the provision of career advice and to starting new businesses.

In addition, the NCBiR announced a new contest in June 2016 that will be implemented under Measure 3.4 "Management in higher education institutions" of the Operational Programme Knowledge Education Development (PO WER). The NCBiR plans to allocate PLN 132 million (approximately EUR 30.2 million) for "Improving the competencies of academic staff" in Polish tertiary education institutions. The competition will select projects aimed at training for academic staff, potentially covering innovative teaching methods and computer skills, information management or teaching in foreign languages. Up to PLN 9 000 (approximately EUR 2 060) will be provided per participant, or PLN 24 000 (approximately EUR 5 500) for those undergoing training abroad. The support is to cover a total of more than 7 000 academic staff.

R&D Sector

The Ministry of Science and Higher Education has offered a scheme "Innovation brokers", sponsoring the employment of sales professionals, who are expected to help HEIs commercialise their technologies by either licensing or launching spin-offs. These individuals receive a regular base salaries and performance bonuses, with targets to increase the number of transactions.

The Ministry also launched a competition called "Incubator of innovativeness", subsidising HEIs to stimulate the formation of spin-offs and the pursuit of technology licensing transactions. In the competition there were a total of 21 entities, of which 14 received support. For the realisation of projects there was planned the amount of PLN 18 million (approximately EUR 4.1 million) (eventually the allocation of funds under this intervention amounted to PLN 19.5 million, approximately EUR 4.5 million). The amount of the financing of the tasks carried out by one entity could not exceed PLN 1.5 million (approximately EUR 340 000).

Polish Accreditation Committee

The Polish Accreditation Committee (*Polska Komisja Akredytacyjna*, PKA) is an independent public institution that works with the Ministry of Science and Higher Education and HEIs to ensure the quality of higher education. As defined in the Law on Higher Education, the role of PKA includes:

1. Programme assessments, including the evaluation of initial teacher training programmes;
2. Giving opinions to the Ministry of Science and Higher Education in matters pertaining to:
   - the granting of authorisations of academic units of higher education institutions to provide programmes in specific fields of study and at specific levels of study where the field of study concerned covers an academic area and domains of science or fine arts, which do not correspond to authorisations to confer postdoctoral degrees (*doctor habilitowany*) held by a given unit;
   - the re-granting of suspended authorisations to provide programmes in specific fields of study and at specific levels of study;
   - the establishment of higher education institutions;

- the establishment of a higher education institution or a branch campus in the territory of the Republic of Poland by a foreign higher education institution;
- the quality of education provided by the unit applying for the authorisation to grant the *doktor* and *doktor habilitowany* degrees.

PKA is composed of up to 90 members appointed by the Minister for Science and Higher Education, who are selected from a pool of candidates who are nominated by the higher education stakeholders, e.g. academic senates, rectors' conferences, employer organisations, national student organisations. The Committee is supported by a secretariat and a network of experts who participate in the assessments and evaluations.

PKA is a member of the European Consortium for Accreditation in Higher Education, the European Association for Quality Assurance in Higher Education and the International Network for Quality Assurance Agencies in Higher Education.

National Centre for Research and Development

The National Centre for Research and Development (*Narodowe Centrum Badań i Rozwoju*, NCBiR) is the implementing agency of the Minister of Science and Higher Education. The main task of the NCBiR is the management and execution of strategic research and development programmes, which lead directly to the development of innovativeness. This includes support for commercialisation and technology transfer activities and the management of applied research programmes.

In addition, NCBiR provides training and development opportunities for young scientists and researchers. This includes training on commercialisation, intellectual property management and business development.

Ministry of Economic Development

The Ministry of Economic Development (*Ministerstwo Rozwoju*) is also active in promoting entrepreneurship as it is responsible for the economy (previously covered by the Ministry of Economy) and regional development (previously covered by the Ministry of Infrastructure and Regional Development). One of the key tasks of the Ministry is the management of projects funded by the European Regional Development Fund and the European Social Fund, including those related to higher education.

The Ministry aims to create an environment that is conducive to entrepreneurship by improving access to capital, promoting the value of entrepreneurial mindsets, strengthening the institutional environment and by improving the availability of industrial intelligence.

Polish Agency for Enterprise Development

The Polish Agency for Enterprise Development (*Polska Agencja Rozwoju Przedsiębiorczości*, PARP) is a state agency that reports to the Ministry of Economic Development. It manages national and European Union funds for fostering entrepreneurship, innovation and human resources development. In the European Union programme period 2014-20, PARP is responsible for the implementation of activities under three operational programmes: Operational Programme Smart Development; Operational Programme Knowledge, Education, Development; and Operational Programme Eastern Poland.

The Agency has a role in supporting entrepreneurship in higher education because it implements economic development programmes that support innovation and research activities of small and medium-sized enterprises (SMEs), regional development, exporting,

development of human resources and use of modern technologies. It manages a large infrastructure of business development service providers, including business incubators and science and technology parks.

1.5. A profile of the case study universities

Seven HEIs participated in the two study visits. These seven HEIs were selected to cover a range of different types and sizes of HEIs in Poland. A brief profile of each institution is provided in Tables 1.2 to 1.8.

Table 1.2. **GUT Gdansk University of Technology**

City	Gdansk
Year of establishment	1945 (1904)
Type of institution	Public technical university
Number of students	33 500
Number of alumni	n/a
Brief profile	The GUT Gdansk University of Technology has nine faculties: Architecture; Chemistry; Electronics, Telecommunications and Informatics; Electrical and Control Engineering; Applied Physics and Mathematics; Civil and Environmental Engineering; Mechanical Engineering; Ocean Engineering and Ship Technology; and Management and Economics. It offers full-time and part-time degrees at all levels of study in each of the nine faculties. In addition, the university offers three interdisciplinary programmes of study in Materials Engineering, Power Engineering and Biomedical Engineering. The university's main research activities are in the areas of mathematics, physics, chemistry, civil engineering, maritime technology, energy, bio- and nano-technologies, architecture, medicine, ecology, IT, electronics and management.
Website	*www.pg.edu.pl*

Table 1.3. **KU Kozminski University**

City	Warsaw
Year of establishment	1993
Type of institution	Non-public
Number of students	Approximately 8 000
Number of alumni	Approximately 40 000
Brief profile	KU Kozminski University was called the Leon Kozminski Academy of Entrepreneurship and Management until 2008, when it was awarded the title university to signify that it was accredited to grant doctoral degrees in at least two disciplines. KU Kozminski University offers a broad portfolio of programmes consisting of full-time and part-time programmes at the Bachelor, Masters and PhD levels. At the Bachelor and Masters levels, programmes are offered in the following five areas: management, finance and accounting, administration, law and, sociology. Programmes are offered in both Polish and English. KU Kozminski University holds doctoral granting rights in five disciplines: management, economics, business law, sociology and finance. In addition, it is the only non-public HEI in Poland that holds habilitation granting rights in management and economics. The University also provides tailored programmes for companies and executive courses. The University's research profile contains the following four key focuses: Economics and Finance, Management and Decision making, Entrepreneurship and Innovation, and Business Law. KU Kozminski University has the following international accreditations: AACSB, AMBA and CEEMAN. It also received an unconditional EQUIS accreditation in 2005. The university is also a full member of ELFA (European Law Faculties Association) and EUA (European University Association).
www.kozminski.edu.pl	Website

The case study HEIs operate in differing regional economic circumstances. Three of the case study HEIs are in Mazowieckie region (Warsaw School of Economics, Warsaw University of Technology and Kozminski University). The region is located in central eastern Poland and includes the Polish capital, Warsaw. Mazowieckie is the largest region, both in terms of area and population, and is the most economically developed region in Poland.

Table 1.4. **UMCS Maria Curie–Sklodowska University**

City	Lublin
Year of establishment	1944
Type of institution	Public general university
Number of students	Approximately 24 000
Number of alumni	Approximately 223 000
Brief profile	Maria Curie-Skłodowska University offers a comprehensive suite of programmes within 12 faculties: Fine Arts and Music; Biology and Biotechnology; Chemistry; Economics; Philosophy and Sociology; Humanities; Mathematics, Physics and Computer Science; Earth Sciences and Spatial Management; Education and Psychology; Political Science; Law and Administration; Political Science; and a Branch Campus in Pulawy. There are currently more than 60 programmes offered with more than 200 specialisations. The university has an equally wide research base, including earth science and spatial management, media and arts, chemistry and nanomaterials, biology and biotechnology, geoinformatics and more. The largest research investment has been the Ecotech-Complex project, which includes BIO-MED (e.g. tissue engineering and hybrid structures; neuroscience and brain injuries; human development and ageing; cancer-related, civilization-related and social diseases); AGRO (e.g. plant and landscape protection, agrobiotechnology, non-food use of agricultural products); ECO (e.g. ecology, climatic changes, environmental pollution, biodiversity, water, air and soil protection, and alternative energy sources) and FOOD (e.g. food security and quality, the effect of the environment on the food chain, food and health, functional and ecological food).
Website	*www.umcs.pl*

Table 1.5. **PWSZ State University of Applied Science in Elblag**

City	Elblag
Year of establishment	1998
Type of institution	Public university
Number of students	2 487
Number of alumni	8 441
Brief profile	The State University of Applied Sciences in Elblag offers 11 Bachelor-level programmes through the institutes Applied Informatics, Technology, Pedagogy and Languages, and Economics. The university also offers postgraduate training courses, notably in IT. Research is conducted in the fields of Computer Science; Robotics, Electronics and Telecommunications; Environment; Mechanical Engineering; and Business and the Global Economy.
Website	*www.pwsz.elblag.pl/*

Table 1.6. **UG University of Gdansk**

City	Gdansk
Year of establishment	1970
Type of institution	Public general university
Number of students	26 896
Number of alumni	n/a
Brief profile	The University of Gdansk was established in 1970 by the amalgamation of the Higher School of Economics in Sopot and Gdansk College of Education. It is a general university that does not have an academic focus. It operates in many different fields, including experimental studies, maths, social sciences and language studies. University of Gdansk offers studies on all levels, many multiple degree programmes (mainly at the Faculty of Law and Administration) and some interdisciplinary programmes (mainly at the Faculty of Biotechnology and Faculties of Math, Physics and IT, Biology and Chemistry).
Website	*www.ug.edu.pl*

Three of the case study HEIs are in or neighbouring Pomorskie (University of Gdansk, Gdansk University of Technology, and The State University of Applied Sciences in Elblag). Pomorskie is located in the north of Poland, at the Baltic Sea and Gdansk Bay. The largest city in the region is Gdansk, which combined with Gdynia and Sopot form one urban agglomeration, Tricity, with a population of 747 000. Elblag is a town that is approximately 60 km east of Gdansk. Although the town is located in Warmińsko-Mazurskie region, it has

Table 1.7. **SGH Warsaw School of Economics**

City	Warsaw
Year of establishment	1906
Type of institution	Public economics university
Number of students	Approximately 17 300
Number of alumni	Approximately 610 000
Brief profile	The SGH Warsaw School of Economics offers a range of programmes at the Bachelor, Masters, Doctoral and post-graduate levels in both Polish and English. The major fields of study in Polish at the Bachelors level are Finance and Accounting; Quantitative Methods in Economics and Information Systems; Management; International Economic Relations; Economics; European Studies; Spatial Planning; Social Policy; and International Relations. In English, Bachelor programmes are available in Global Business, Finance and Governance; International Economics; Management; and Quantitative Methods in Economics and Information Systems. At the Masters level, programmes are offered in Polish in Finance and Accounting; Quantitative Methods in Economics and Information Systems; Management; and International Economic Relations. Masters-level programmes in English are offered in Advanced Analytics – Big Data; Finance and Accounting; Global Business, Finance and Governance; International Tourism, Hotel Industry and Leisure Services; and International Business. PhD studies are available as part-time or full-time-programmes, including some in English. There are currently 18 PhD programmes in economics, management, finance, or public policy. The SGH Warsaw School of Economics conducts research in various areas of economics, finance, management and business administration, as well as in public policy and political science.
Website	*www.sgh.waw.pl*

Table 1.8. **WUT Warsaw University of Technology**

City	Warsaw
Year of establishment	1915
Type of institution	Public technical research university
Number of students	34 269
Number of alumni	n/a
Brief profile	The WUT Warsaw University of Technology focuses on three main activities: education, scientific research and transfer of technology. It offers education at the Bachelors, Masters and Doctoral levels in 20 Faculties, covering nearly all fields of engineering and more. The faculties are: Administration and Social Sciences; Architecture; Automotive and Construction Machinery Engineering; Chemical and Process Engineering; Chemistry; Civil Engineering; Electrical Engineering; Electronics and Information Technology; Environmental Engineering; Geodesy and Cartography; Mathematics and Information Science; Management; Materials Science and Engineering; Mechatronics; Production Engineering; Physics; Power and Aeronautical Engineering; Transport; Civil Engineering, Mechanics and Petrochemistry; College of Economics and Social Sciences; and an International Business School. Other units of WUT Warsaw University of Technology include: Centre for Advanced Studies; Research Centre for Energy & Environmental Engineering; Research Centre for Functional Materials; Centre for Distance Learning; Foreign Language Centre; Centre for Physical Education & Sports; Centre for International Co-operation. Scientific research is conducted across all faculties and at one college. In addition, it is realised in a number of academic research centres: Academic Research Centre for Functional Materials; Academic Research Centre for Power Engineering and Environment Protection; Academic Research Centre for Sustainable Energy Systems; Academic Research Centre for Aerospace Engineering; Academic Research Centre for Defence and Security; Centre for Advanced Materials and Technologies CEZAMAT; and Centre for Preclinical Research and Technology CePT.
Website	*www.pw.edu.pl*

a strong relationship with Pomorskie. The economy in Pomorskie is strong relative to other regional economies in Poland, and the Tricity sub-region is one of the top three performing sub-regions in Poland.

One of the case study HEIs is in Lubelskie region (Maria Curie-Sklodowska University in Lublin). Lubelskie is located in the south-eastern Poland and it borders Belarus and Ukraine. The capital is Lublin, with a population of 343 600 people. Lubelskie is one of the least populated and the least urbanised regions in Poland. Furthermore, it has a declining

population due to negative birth rate and out-migration. The Lubelskie region is characterised by the highest proportion of the labour force employed in agriculture. The average monthly income in the region is below the national average (agriculture excluded).

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Chapter 2

Applying HEInnovate to higher education in Poland

This chapter provides an assessment of the national higher education system in Poland with respect to the seven dimensions of the HEInnovate framework and the good practice statements under each dimension. This covers issues related to university leadership and governance; organisational capacity; entrepreneurial teaching and learning; preparing entrepreneurs; knowledge transfer; internationalisation; and measuring impact. This analysis is based on two study visits, the HEI Leaders' Survey and a Student Survey. The chapter also includes recommendations for the national government and for higher education institutions.

2.1. Leadership and governance

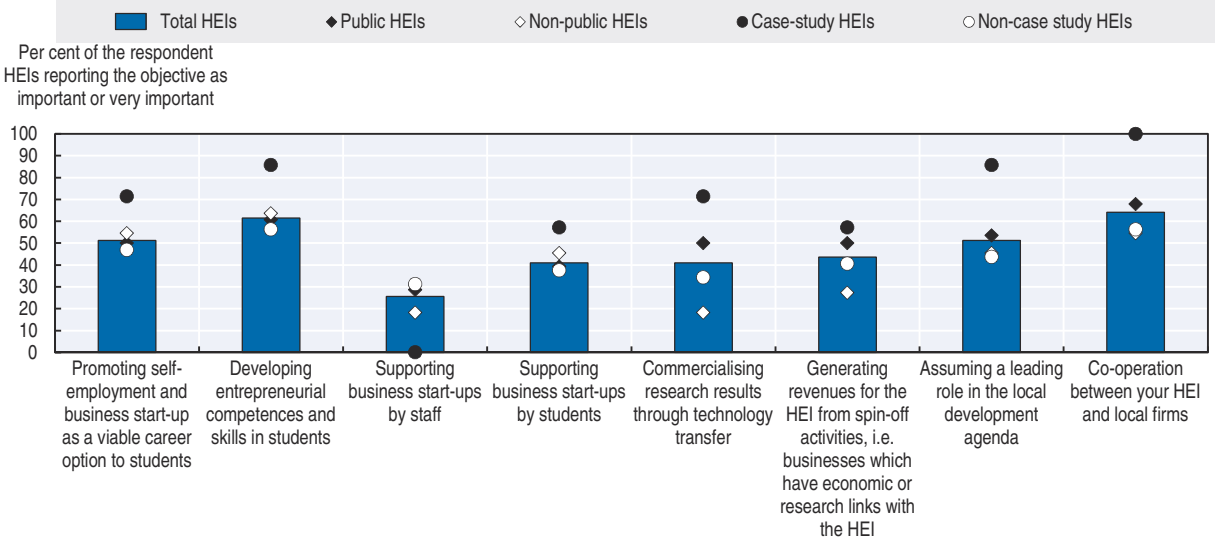
Entrepreneurship is a major part of the HEI's strategy

It is mandatory for Polish higher education institutions (HEIs) to have written and formally approved strategic plans. This was confirmed by the OECD HEI Leader Survey where 31 out of 33 HEIs reported that their institution had a strategic document that states its vision, mission and values. The two HEIs that reported that they did not have written strategic documents indicated that such documents were under development and in discussion with the institution's governing body. The survey also indicated that strategies are prepared with inputs from relevant stakeholders, but that stakeholder participation is typically limited to the local area. The participation of international entities in this process is very rare.

Innovation and entrepreneurship have a strong role within the strategic plans of many of the HEIs. Results of the HEI Leader Survey indicate that approximately half of the HEIs viewed strategic objectives related to innovation and entrepreneurship as "important" or "very important" for their institution (Figure 2.1). These objectives include co-operating with local business, contributing to local development and developing entrepreneurial skills and competences in students. However, the HEIs that were visited do not tend to explicitly reflect these strategic objectives in their written strategic documents and mission statements, which are oriented towards the two more traditional missions of HEI (i.e. education and research). It is therefore difficult for external stakeholders to identify these activities as core to the HEIs' activities.

Figure 2.1. **Entrepreneurship objectives**

"How important are the following objectives for your HEI?" (responses: important or very important)



Note: Total number of respondents was 39, of which 28 were public HEIs, 11 were non-public HEIs; 7 were case study HEIs and 32 were not case study HEIs.

Source: OECD (2016), *OECD HEI Leader Survey Poland*.

Another area for improvement for HEIs is to develop targets and metrics in strategic areas related to innovation and entrepreneurship. Only half of the HEIs with strategic objectives related to innovation and entrepreneurship reported that performance indicators had been developed for these objectives and that they are regularly monitored. The lack of clear systemic goals and approaches to achieving them hinders the ability of HEIs to fully achieve their objectives since units and individuals may take different approaches that are not fully aligned with the HEI's overall entrepreneurial strategy.

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

It is a common practice for Polish HEIs to have someone in a senior management position (e.g. Rector or Vice-Rector, Dean or Director) that is responsible for the implementation of entrepreneurship and innovation activities. This was true in all of the HEIs that were visited during the two study visits. More broadly, the HEI Leader Survey reveals that 59% of the surveyed HEIs had a senior manager responsible for entrepreneurship education and 53% for business start-up support.

However, in many HEIs visited, this leadership function was extremely dependent on the individual who had that role. The senior-level commitment and leadership did not seem to be fully institutional and it is not clear if this commitment would remain if there were changes in senior management. Many HEIs raised this concern during the study visits, underlining the need to strengthen the importance and role of entrepreneurship within strategic frameworks and leadership structures for HEIs.

The only exception identified during the visits was at the GUT Gdansk University of Technology, where the position of Vice-Rector for Co-operation and Innovation was explicitly created (it has since been changed to Vice Rector for Internationalisation and Innovation). The role of this Vice Rector was to drive innovation activities and to build strong relationships with the business community and international partners. The creation of such a position ensures that these activities remain central to the HEI's core activities and also sends a strong signal to stakeholders and potential partners that the HEI is open to collaborations.

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

Within the HEIs visited, many entrepreneurial actions were observed across teaching and research activities, as well as in relationships with external stakeholders and contributing to local economic development initiatives. These activities were typically driven and implemented by various units and centres within the HEIs, including for example, career offices, technology transfer offices, special purpose vehicle companies to support spin-out companies, business incubators and research centres. In most cases, these activities were under the oversight of a senior manager, typically a Vice-Rector. However, the Vice-Rector rarely had a strong leadership role that drove the activity. The exception was the already noted Vice-Rector for Co-operation and Innovation at the GUT Gdansk University of Technology, whose duties included driving the entrepreneurial agenda at the institution.

This decentralised approach currently works reasonably well. Relationships with external stakeholders are frequent, as are collaborations across faculties and units. However, these connections are mostly due to informal channels. The only formal structure that was observed across HEIs was the use of advisory boards that typically included representation from local government and the business community. These boards are used extensively at

the seven case study HEIs to collect external views on HEI activities and to strengthen relationships with key stakeholders. Moreover, all respondents to the HEI Leader Survey indicated that similar advisory boards are used.

However, the decentralised approach to co-ordinating and integrating entrepreneurial activities across HEIs will likely be less effective as the number of HEI activities increase in this area. Without strong co-ordination, there is a high risk of duplication of activities by different units within the HEI.

The HEI encourages and supports faculties and units to act entrepreneurially

HEIs are autonomous institutions in Poland and units and centres within HEIs also appear to have a high level of autonomy. The HEIs that were visited had an open attitude towards new ideas or proposals coming from within the academic community and also from external stakeholders, especially when formal communication channels such as advisory boards were used.

This high level of autonomy within HEIs creates an environment where it is relatively easy to implement innovative and entrepreneurial ideas. This autonomy, however, also creates an uneven environment because the degree to which entrepreneurial actions are implemented depends on the ambition of the units.

One of the challenges faced in Poland is that acting entrepreneurially is not well compensated for individuals. The career progression of academic staff largely depends on research outputs, which in many cases discourages them from getting involved in the entrepreneurial agenda since these activities take away time from their research. Similarly, faculty budgets at the case study HEIs appear to be largely determined by research activities and the publication of scientific works, suggesting that it can be difficult to secure financial resources for other activities.

Even focusing solely on research commercialisation, HEIs currently do little to create staff incentives. The HEI Leader Survey indicates that less than 30% of HEIs have a system to support staff in the commercialisation of their research (Figure 2.2). Moreover, 75% of those HEIs that reported having an incentive system indicated that incentives are placed at the level of faculties/departments, and are not aimed at individual professors or researchers.

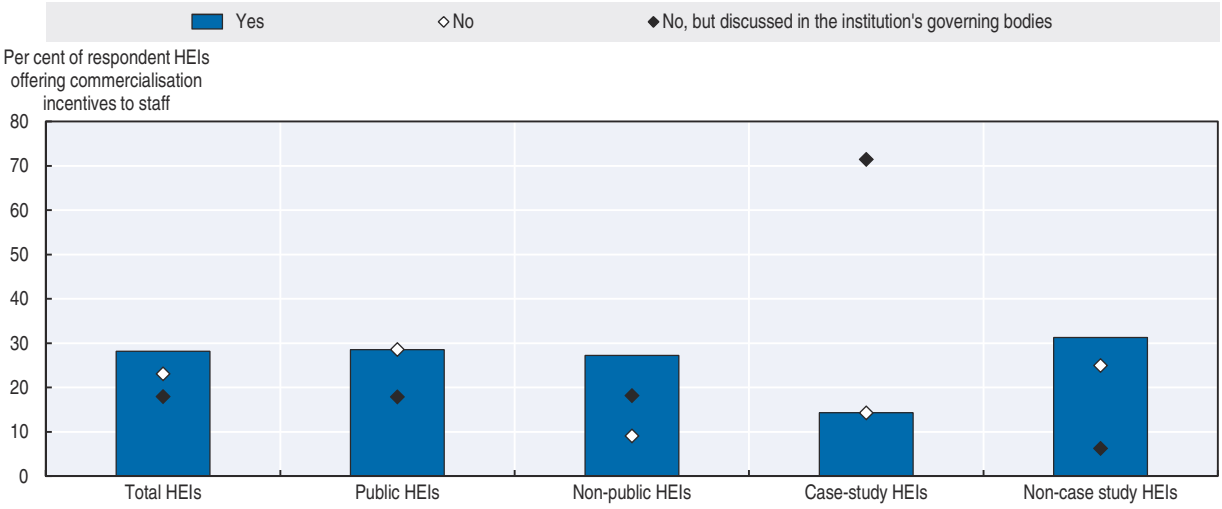
The HEI is a driving force for entrepreneurship and innovation in regional, social and community development

The HEI Leader Survey indicates that 51% of responding HEIs have strategic objectives related to local economic development (Figure 2.1). Further, more than half of HEIs have developed relationships with various public and non-public actors for the purposes of contributing to local economic development (Figure 2.3). Public HEIs appear to be more connected with government bodies, while non-public HEIs are more likely to work with chambers of trade, commerce and industry. Surprisingly, public HEIs also appear to be much less likely to work with industry clusters.

The HEIs visited during the two study visits are relatively more active than other HEIs in contributing to local development. According to the survey, these HEIs have very strong links with local and regional government, industry clusters, chambers of commerce and industry associations. This was corroborated during the study visits, where many good examples of integration and interaction with the local community were observed. One particularly good example is that of PWSZ The State University of Applied Sciences in Elblag, where the HEI

Figure 2.2. **Incentive system for staff**

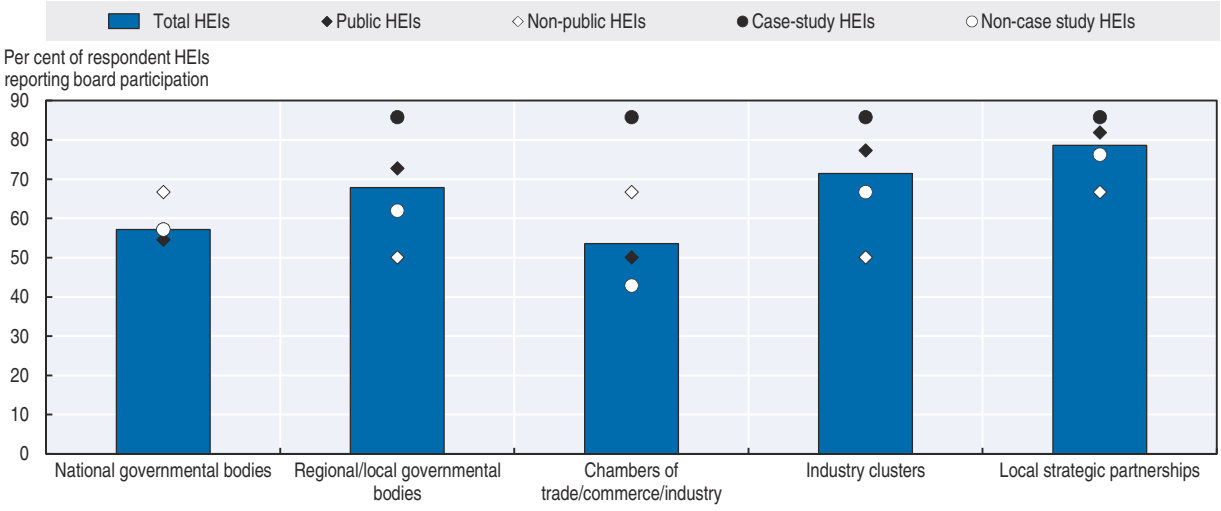
"Does your HEI have an incentive system for staff, who actively support the commercialisation of research for example by making research results available, acting as mentors, etc.?"



Note: Total number of respondents was 39, of which 28 were public HEIs, 11 were non-public HEIs; 7 were case study HEIs and 32 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

Figure 2.3. **Shaping the local economy**

"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?"



Note: Total number of respondents was 28, of which 22 were public HEIs, 6 were non-public HEIs; 7 were case study HEIs and 21 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

had strong linkages with industry, local governments and science parks. These partnerships provided opportunities for students to be active in the community and helped connect industry and researchers.

Many HEIs also discussed the potential of regional "Research and Innovation Strategies for Smart Specialisation" (RIS3) during the study visits. Several HEIs appeared to have played an important role in defining these strategies and look to continue to be active in the

management of related activities. Involvement of HEIs in Smart Specialisation Strategies holds promise for strengthening the linkages between industry and higher education through the funding channels and joint projects that the strategies involve.

Another way in which HEIs contribute to local development is through developing and supporting graduates who go on to be successful entrepreneurs or senior managers in local companies. The SGH Warsaw School of Economics is a good example of this.

Key recommendations for leadership and governance

For the Ministry of Science and Higher Education:

- Use the recently established Innovation Council to define an entrepreneurial agenda for higher education and manage its implementation in co-operation with all actors in the higher education system and other relevant stakeholders.
- Create more incentives for private sector companies to work with HEIs.

For HEIs:

- Include an entrepreneurial perspective in HEI and faculty advisory boards.
- Appoint a senior manager to be responsible for managing the "third mission".
- Increase co-operation with other stakeholders such as national and regional government, chambers of commerce and industry clusters.
- Set objectives and targets to guide the implementation of the entrepreneurial vision.

2.2. Organisational capacity

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

A wide variety of activities related to innovation and entrepreneurship is taking place in many Polish HEIs, supported by a number of dedicated units. However, it appears that many of these activities are new and have only limited financial and human resources dedicated to them. Most entrepreneurial activities at the case study HEIs had been launched within the last five to ten years and had little financial resources. They were typically led by only one or two staff members, although more staff were often involved due to their own personal interest and initiative. There is good scope to continue these new developments with more and larger projects and initiatives.

While a small number of the entrepreneurial activities appear to generate their own revenue streams, there is also a need for central investment from the HEIs in these activities so that the units and centres (e.g. knowledge transfer centres, career offices, special purpose vehicles for spin-outs) can fulfil their mandates and meet the needs of researchers and students. Funding to date has been quite reliant on operational programmes supported by European Union Structural and Investment Funds. These funding streams are often short-term, which has led to discontinuity in many of the initiatives to date. For example, the Top 500 Innovators Programme aimed to identify top researchers and facilitate a knowledge exchange between them and other academic staff. This programme supported several activities, including international exchanges of young innovative researchers and knowledge transfer professionals to learn international best practice and disseminate them within Poland. The initiative was popular and widely considered to be a success. However, the exchange activity ended after one programming period (a new iteration of the programme

has been launched for employees of enterprises), although an association was set up to act as an inter-disciplinary exchange platform for researchers and technology transfer officers. It remains to be seen how effective the association will be in replacing the former programme activity, but there is a risk that a discontinuation of the exchange activity will reduce the in-take of international experience into the Polish higher education system.

Another challenge is that many entrepreneurial activities could not be funded with European Structural and Investment Funds since they were commercial activities (or had elements of commercial activity). For example, several HEIs, notably in Gdansk, indicated that they could not use EU Structural and Investment Funds to support laboratories or research facilities that were used for research that had commercial purposes. This non-commercial condition appears to have been set by some regional managing authorities and is a major hindrance to developing entrepreneurial activities within HEIs, both in terms of supporting researchers in working with industry but also for providing students with practical opportunities to experience entrepreneurship.

One option for increasing funding for entrepreneurial HEIs is to adjust the formula used by the Ministry to set HEI annual budgets. This would provide more stable funding but also signal the importance of innovation and entrepreneurship activities to the HEIs.

Alternatively, HEIs could be more entrepreneurial themselves by raising their own funds for these activities. While this has not been a traditional funding route in Poland, the HEI Leader Survey indicates that approximately half of Polish HEIs are undertaking some fund-raising activities. This may be pursued further in the future, but will likely only be a complementary source of resources.

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

In general, communication and collaboration between faculties, students and academic staff appears to take place through both formal and informal channels. Many examples of inter-faculty and inter-disciplinary collaborations were observed during the study visits, including formal agreements for academic staff in other faculties to teach entrepreneurship to other students.

However, there is often a lack of detailed knowledge across the HEIs about what entrepreneurship support exists in other faculties. Similarly, information flows with the wider HEI community could be improved. Better information flows on entrepreneurial and innovative activities could be built into HEI governance models, with a stronger role for advisory boards and positions in senior management (e.g. Vice-Rectors or Vice Deans) that are dedicated to and responsible for this agenda.

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

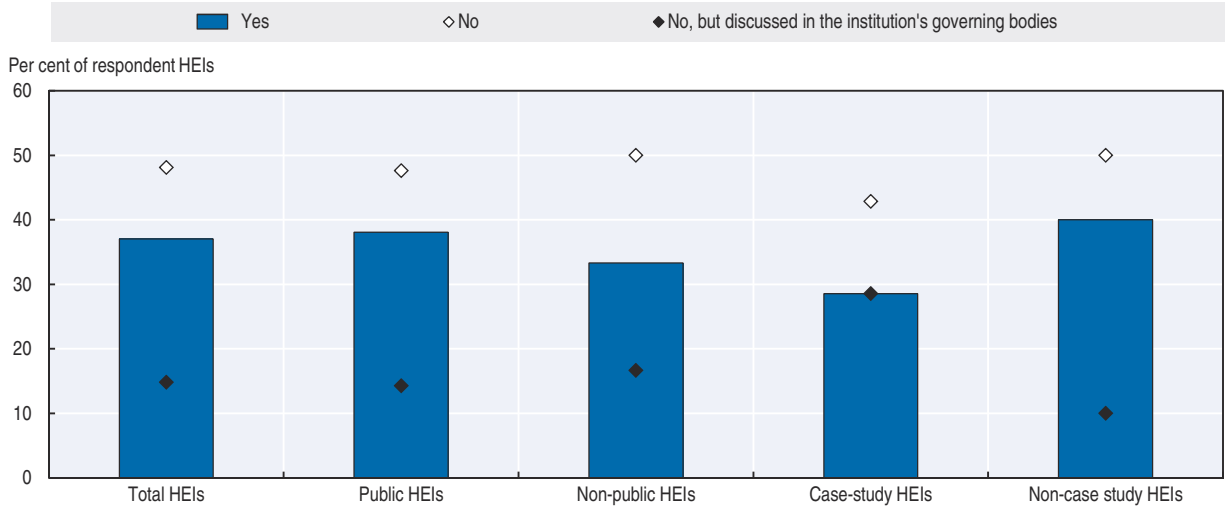
Various approaches are being adopted to bring experiences from the outside world into HEIs, mostly with regards to involving guest speakers or business-oriented people in teaching activities, including those related to entrepreneurship. However, the extent of this practice varies substantially from one HEI to the other and across faculties within the same HEI.

Furthermore, the predominant criteria for hiring academic staff are still almost exclusively focused around scientific publication, something that is also common to many other countries, and may need to be re-addressed, in order for innovation and entrepreneurship

activities and results to be also duly taken into account. For example, fewer than 40% of HEIs that responded to the HEInnovate Leader Survey indicated that their HEI considers private sector experience when they are recruiting academic and research staff (Figure 2.4).

Figure 2.4. **Recruitment of non-academics**

"In the recruitment of academic and research staff, is prior experience in the private sector considered as a recruitment criterion?"



Note: Total number of respondents was 27, of which 21 were public HEIs, 6 were non-public HEIs; 7 were case study HEIs and 20 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

Another important way of engaging with entrepreneurial individuals is through governance models and the ways external stakeholders participate in top level bodies of the HEI and their faculties. In this context, Advisory Boards with representatives from companies and other organisations are becoming common, and may be reinforced, including their possible participation in key strategic decisions related to the HEI and its innovation or entrepreneurship activities and results.

The HEI invests in staff development to support its entrepreneurial agenda

In Poland, academic staff are hired, evaluated and promoted based on their research and scientific performance, rather than contributions to the construction or implementation of an entrepreneurial HEI. Thus, there is much that can be done to support staff development with respect to entrepreneurial activities. Furthermore, key professional staff in the areas of innovation and entrepreneurship are still quite recent in Polish HEIs, and many of them are in non-permanent positions and thus dependent upon the duration of certain specific projects, often supported by European Union Structural and Investment Funds.

In order to increase support for the entrepreneurial agenda, innovation and entrepreneurship activities and outcomes should be taken into account when academic staff are recruited or promoted (e.g. considering patents and patent licensing agreements, contract research and development with companies or other organisations, spin-off creation, participations in NGO activities that may contribute to local development or triple helix models of collaboration, teaching and learning activities, or acting as a mentor to student entrepreneurs).

Similarly, highly qualified professionals, fully dedicated to innovation and entrepreneurship activities, through specific units aimed at supporting this agenda (e.g. career, technology transfer or industrial property offices, incubators or special purpose vehicles for spin-off creation), should be able to have well-defined and stable careers within the HEI, to further motivate their dedication to these still recent fields of intervention. This can also reduce job turnover and ensure that people with relevant skills remain in such functions and at the HEI, avoiding the loss of cumulative knowledge and relationships that may not be easily replaced.

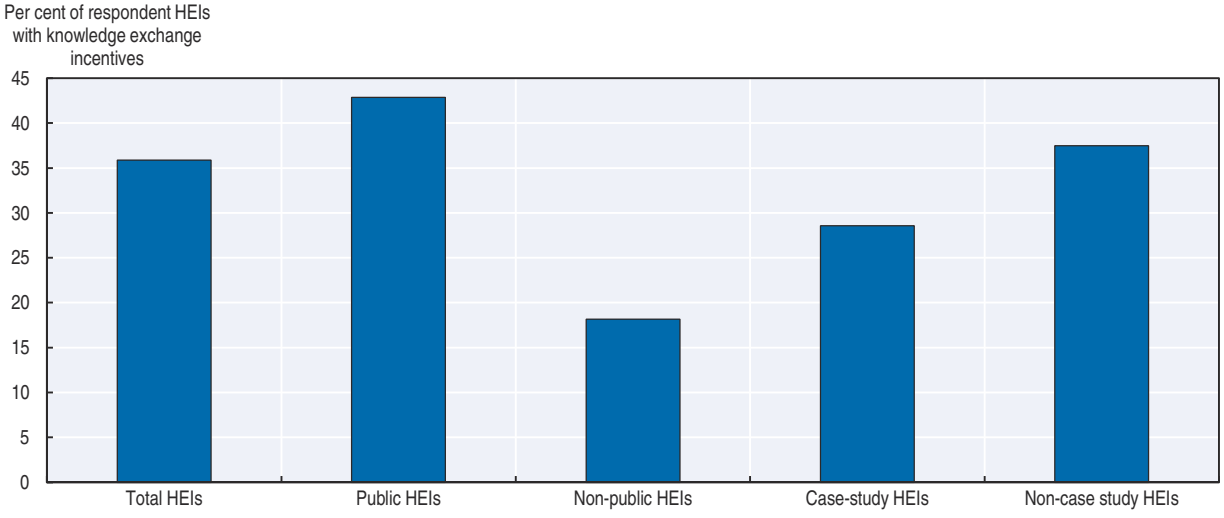
Since organised and structured entrepreneurship activities in Polish HEIs, considerable additional training, promotion and awareness may still be needed in entrepreneurship, involving local, national and international learning opportunities for the following groups of people: i) senior management (e.g. Rectors, Vice-Rectors, Deans and Directors); ii) academic staff involved in entrepreneurship teaching; iii) academic staff in general; and iv) non-academic staff leading entrepreneurial HEI offices and activities.

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

As already noted, there is a lack of formal recognition for the activities of innovation and entrepreneurship carried out by either academic or non-academic staff from a career development point of view. Only 35% of HEIs indicated in the HEI Leader Survey that they had an incentive system for supporting the entrepreneurial agenda (Figure 2.5).

Figure 2.5. **Staff incentives for supporting the entrepreneurial agenda**

"Does the HEI have an incentive system for staff to contribute to the HEI's knowledge exchange activities other than through commercialisation of research results?" (response = Yes)



Note: Total number of respondents was 39, of which 28 were public HEIs, 11 were non-public HEIs; 7 were case study HEIs and 32 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

The same also applies to other kinds of rewards, namely: i) awards and formal recognition; ii) compensation in terms of reductions in teaching or research workloads given the third mission contributions provided; iii) economic rewards related to sharing results and outcomes obtained with the HEI, such as additional revenues generated or spinoff profits; and iv) grants and fellowships for further development of projects, including training

possibilities. Such kinds of incentives may be established at the individual level, but can also be applied to motivate and recognise teams, departments, faculties or HEIs, or even cities or regions, in terms of what they have been able to achieve with respect to entrepreneurial HEI activities and results.

Key recommendations for organisational capacity

For the Ministry of Science and Higher Education:

- Provide a specific budget allocation to HEIs to implement entrepreneurial strategies, either directly or through competitive mechanisms.
- Modify the legal framework to allow for the possibility of professional promotion of academic staff based on criteria other than research outcomes.

For HEIs:

- Provide incentives for staff to engage in the entrepreneurial agenda, e.g. grants, awards, workload reductions, etc.
- Provide training possibilities for staff and reward excellent performance in teaching, research and entrepreneurship.
- Strengthen relationships with alumni to engage their support for the entrepreneurial agenda.

2.3. Entrepreneurial teaching and learning

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

Most Polish HEIs are increasingly offering a large range of learning opportunities to facilitate innovative teaching and learning across all faculties. Approaches are becoming more interactive, but often remain quite traditional, typically relying on lecture style teaching. All HEIs that responded to the Leader Survey indicated that lectures are a commonly used teaching method while work-based methods (e.g. problem solving, work-based learning) were used much less frequently (Figure 2.6). This results in teaching that is oriented towards transferring knowledge rather than stimulating and developing mindsets.

There is also room to make courses more interdisciplinary so that students are exposed to different ways of thinking. Few examples of interdisciplinary learning were observed in the case study HEIs, although student research circles are common and can offer students an informal opportunity to work and learn with students from other disciplines.

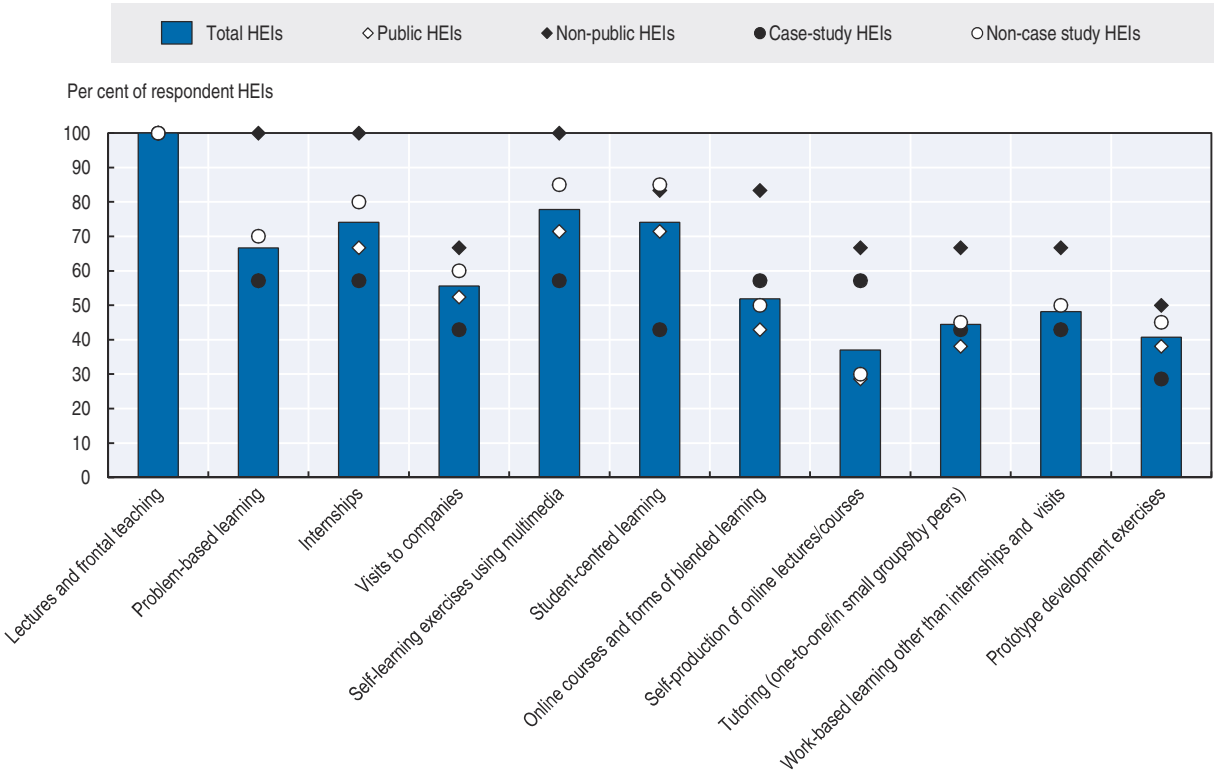
The HEI provides diverse informal learning opportunities and experiences to stimulate the development of entrepreneurial mindsets and skills

Extracurricular learning opportunities have become an important complement to formal entrepreneurship courses in Polish HEIs. The HEI Leaders Survey shows that there has been a great increase in student demand for informal learning opportunities across nearly all HEIs (Figure 2.7).

The most popular informal learning method with students is the student research circles, which are an important part of student life and education. Students organise these clubs around an objective (e.g. to offer business counselling to other entrepreneurs) and are supported by an academic staff member who provides mentorship and guidance when

Figure 2.6. **Teaching methods**

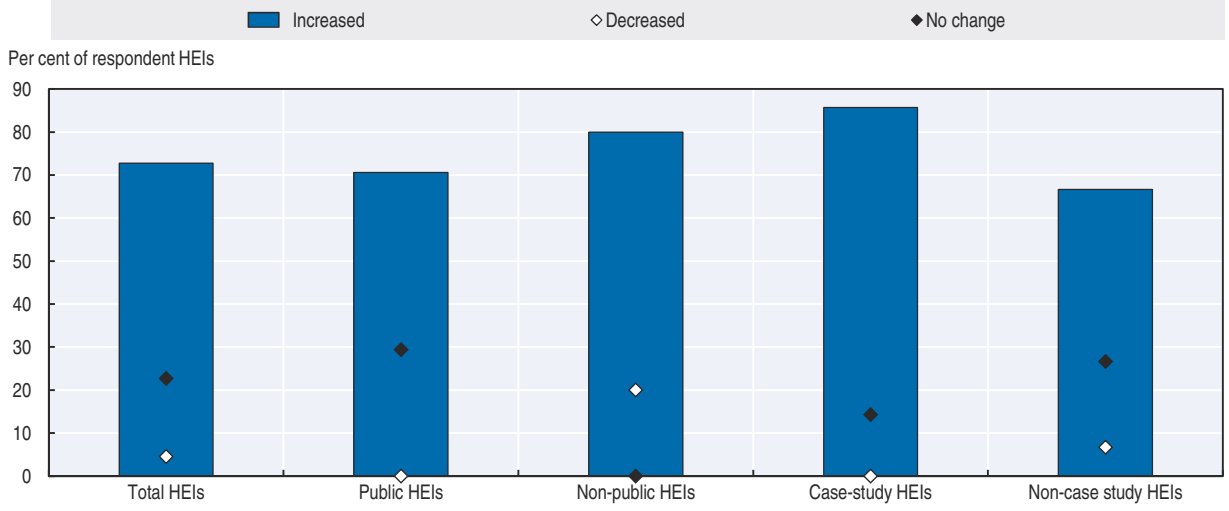
"To what extent are the following teaching methods used at your HEI?" (response = regularly used or primarily used)



Note: Total number of respondents was 27, of which 21 were public HEIs, 6 were non-public HEIs; 7 were case study HEIs and 20 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

Figure 2.7. **Demand for extra-curricular entrepreneurship education**

"Has the participation rate for extra-curricular entrepreneurship education activities increased or decreased over the last 5 years?"



Note: Total number of respondents was 22, of which 17 were public HEIs, 5 were non-public HEIs; 7 were case study HEIs and 15 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

needed. Many of these clubs have developed entrepreneurial activities or are centred on entrepreneurship. While students do not receive formal course credits for participating in student research circles, HEIs do encourage these types of activities and promote them as experiences that enrich the HEI experience.

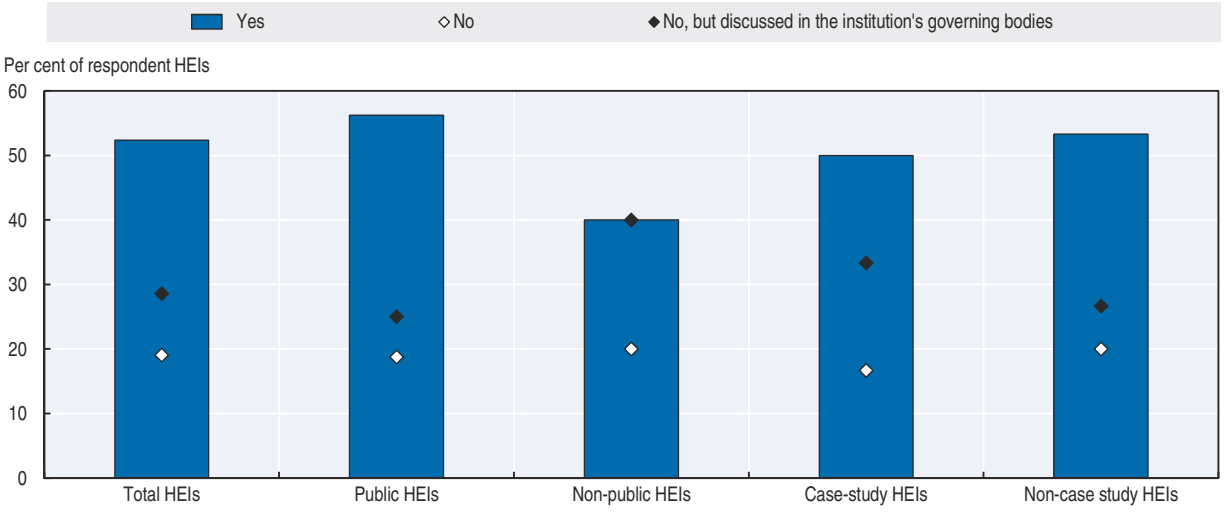
Business plan competitions are also an important part of extracurricular opportunities for students. These are offered by many HEIs and also in the off-campus community by local and regional governments.

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

Only approximately half of respondents to the HEI Leader Survey indicated that they undertake formal evaluations of entrepreneurship education activities, although another 30% indicated that there are ongoing discussions about potentially implementing evaluations (Figure 2.8). Furthermore, the case study HEIs generally do not validate entrepreneurial learning outcomes. There was some confusion between entrepreneurship and management at most HEIs, which led to a rather limited codification of expected entrepreneurial learning outcomes in relation to knowledge, skills and competences.

Figure 2.8. **Evaluating entrepreneurship education**

"Is there a formal evaluation of the entrepreneurship education activities?"



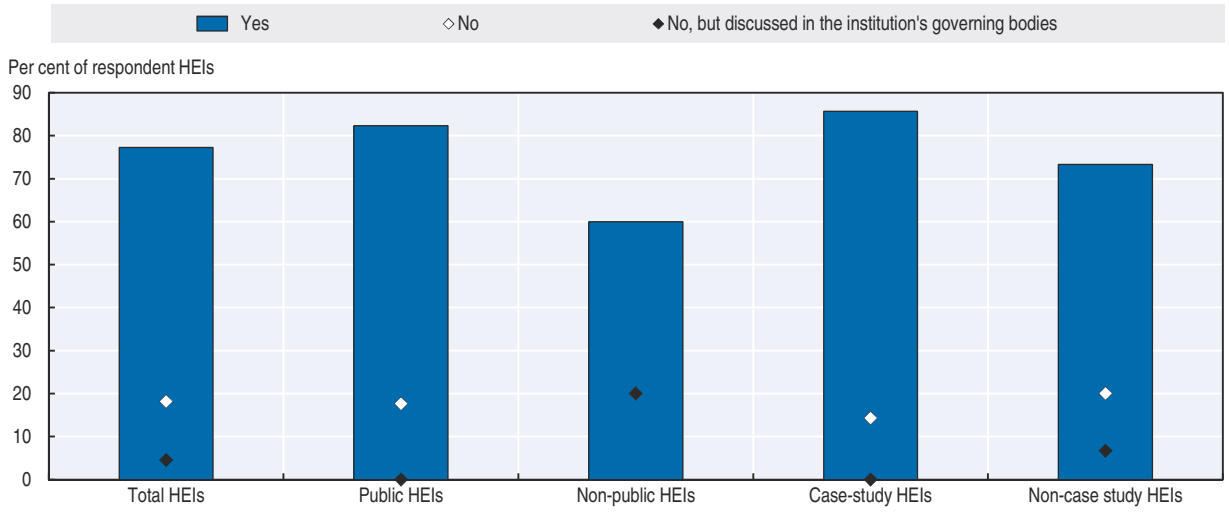
Note: Total number of respondents was 21, of which 16 were public HEIs, 5 were non-public HEIs; 7 were case study HEIs and 14 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

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

External stakeholders are generally an important source of expertise in entrepreneurial teaching and learning in Poland. Nearly 80% of HEIs that responded to the HEI Leader Survey indicated that they co-design entrepreneurship education with external stakeholders (Figure 2.9) and nearly 70% indicate that they deliver it with external stakeholders (Figure 2.10). Furthermore, all of the case study HEIs demonstrated strong partnerships with other community organisations in this area, including the business community, local and regional governments and chambers of commerce. These partners advise the HEIs through

Figure 2.9. **Designing entrepreneurship education with partners**

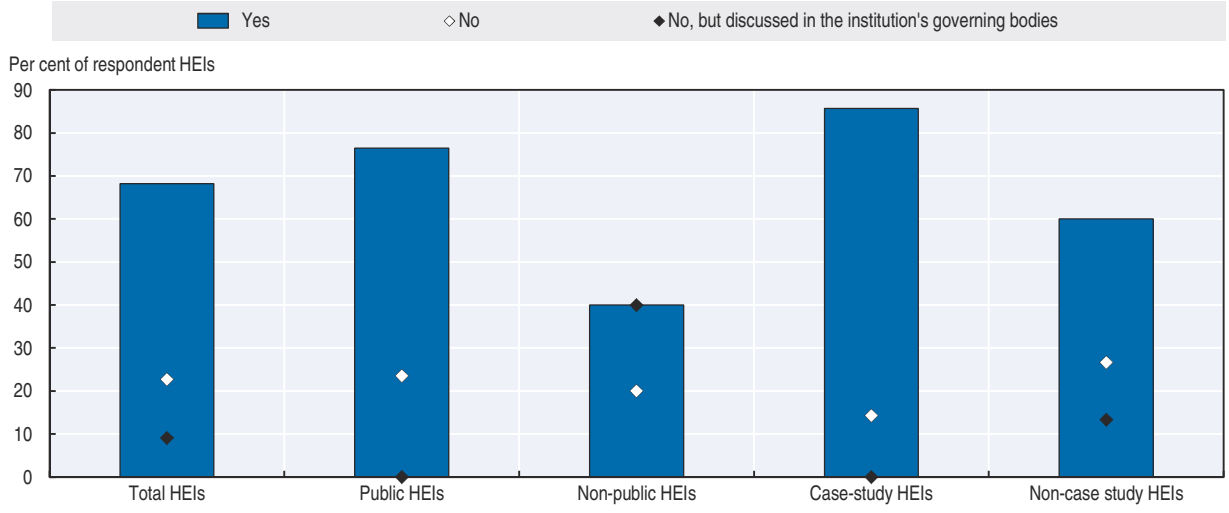
"Does your HEI collaborate in the conceptual development of the entrepreneurship education activities with organisations and individuals that do not belong to the HEI?"



Note: Total number of respondents was 22, of which 17 were public HEIs, 5 were non-public HEIs; 7 were case study HEIs and 15 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

Figure 2.10. **Delivering entrepreneurship education with partners**

"Does your HEI collaborate in the delivery of the entrepreneurship education activities with organisations and individuals that do not belong to your HEI?"



Note: Total number of respondents was 22, of which 17 were public HEIs, 5 were non-public HEIs; 7 were case study HEIs and 15 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

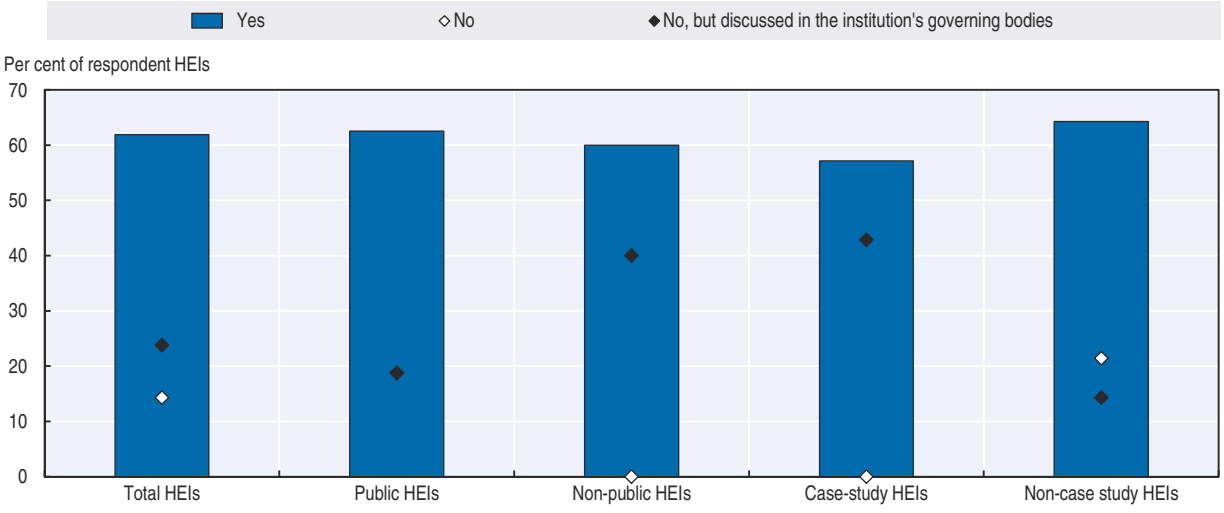
advisory boards on the content of the education and it is common for entrepreneurs to participate in the delivery of the education. Nevertheless, one area for improvement for the HEIs is to strengthen linkages with the financial sector, which can strengthen financial literacy education and increase opportunities for student and staff entrepreneurs to build relationships with investors.

Results of entrepreneurship research are integrated into the entrepreneurial education offer

Results of entrepreneurship research are occasionally included in entrepreneurship teaching. The HEI Leader Survey indicates that approximately 60% of respondent HEIs use research results in their entrepreneurship teaching and training (Figure 2.11). A challenge in Poland, however, is that entrepreneurship is not seen as an academic discipline that is on par with traditional subjects, such as mathematics or chemistry, and entrepreneurship professors identify themselves either as economic researchers or researchers in management science. This inhibits the use of entrepreneurship research in teaching since the academic staff do not appear to keep abreast of current entrepreneurship research results and trends. One method to strengthen this element of entrepreneurship education would be to improve support for Polish entrepreneurship professors to participate in international entrepreneurship education networks and attend international entrepreneurship conferences.

Figure 2.11. **Integrating entrepreneurship research into teaching**

"Are research results integrated into the entrepreneurship education activities?"



Note: Total number of respondents was 21, of which 16 were public HEIs, 5 were non-public HEIs; 7 were case study HEIs and 14 were not case study HEIs.

Source: OECD (2016), *OECD HEI Leader Survey Poland*.

Key recommendations for entrepreneurial teaching and learning

For the Ministry of Science and Higher Education:

- Develop a resource base for entrepreneurship education, including a platform for good practice exchange.

For HEIs:

- Adopt a broader perspective of entrepreneurship in teaching and learning activities, including various forms of entrepreneurship (e.g. social entrepreneurship, part-time entrepreneurship).
- Build-up entrepreneurship as an academic field by increasing participation in international entrepreneurship networks and by supporting entrepreneurship research.
- Promote interdisciplinary teaching and learning.

- Increase the use of action-based education.
- Promote the development of entrepreneurial soft skills in diverse learning teams.
- Integrate entrepreneurial teaching and learning into professor assessments.
- Include more external HEI stakeholders in the design and delivery of entrepreneurship education.

2.4. Preparing and supporting 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

Entrepreneurship is increasingly encouraged and promoted to students by HEIs through various channels. Students are encouraged to be involved in projects leading to entrepreneurial opportunities, for instance through research circles centred on entrepreneurship or the involvement of students in entrepreneurial events like the Global Entrepreneurship Week. Entrepreneurship is also increasingly included in curricula.

Alumni, however, are not very engaged with their HEIs in general, although some personal connections and contacts between faculty and alumni were observed during the study, notably at the SGH Warsaw School of Economics. Broadly, the lack of engagement with alumni is a missed opportunity to strengthen ties between HEIs and the business community. This could be leveraged further to increase awareness about entrepreneurship.

Starting one's own venture and the commercialisation of research are strongly encouraged for academic staff, but these activities are not taken into account in the faculty evaluation/promotion system. Most universities have special purpose vehicles for spin-offs creations by their staff, but the scale of activities is very low.

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

Most HEIs help students and staff in taking their first steps in preparing for a start-up (Figure 2.12). The most common form of start-up support consists of the suite of services offered by the AIP incubators. These services are quite basic but have a good reach within the HEIs. Career offices also have a strong role in this area by offering some workshops and events, and also directing students to where further support can be obtained. Some HEIs also provide intellectual property assistance for potential start-ups, but principally for academic staff and not enough for students.

Most HEIs also provide support for academic staff interested in business creation, including assistance with intellectual property management. The start-up support for academic staff is generally of higher quality than that for students.

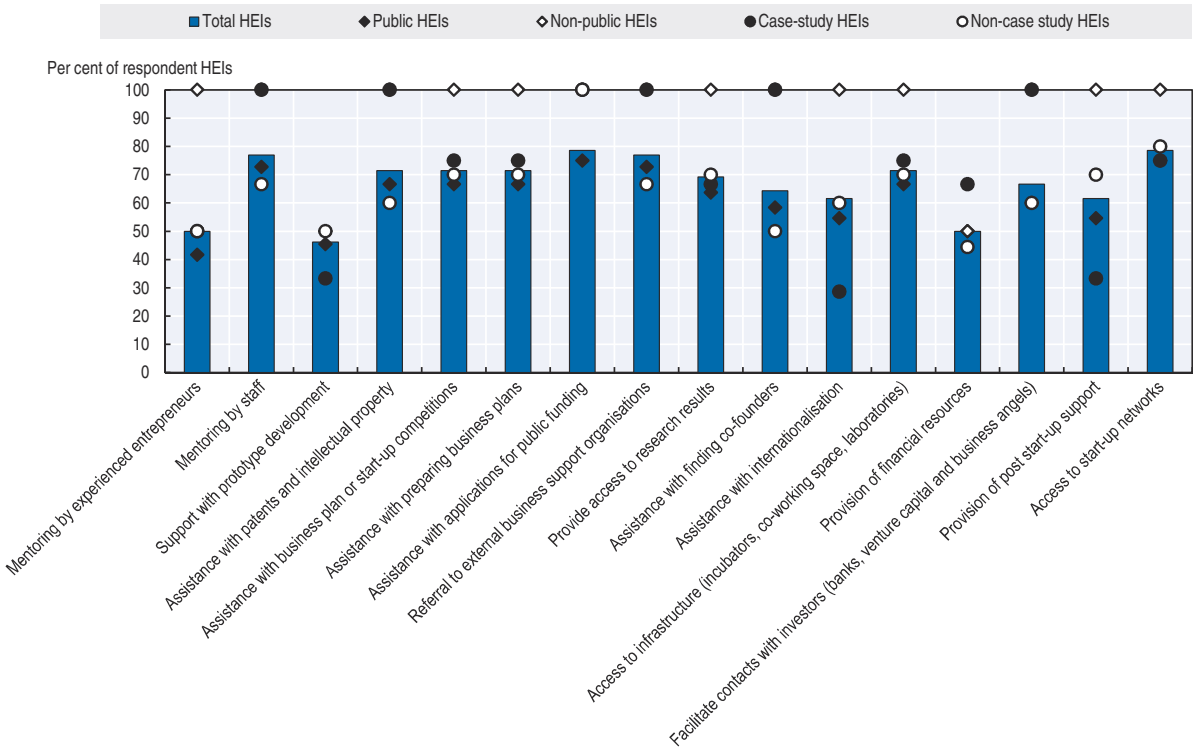
Results from the HEI Leader Survey suggest that mentoring from academic staff is widely available to student entrepreneurs. There is nonetheless room to engage more with entrepreneurs for the purposes of mentoring students.

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

Entrepreneurship courses provide relevant knowledge to participants about starting, running and growing a business in areas such as financing, legal and regulatory issues, or

Figure 2.12. **Start-up supports offered**

"What special support measures for individuals or teams who are interested in starting-up a business are currently offered at your HEI?"



Note: Total number of respondents was 14, of which 12 were public HEIs, 2 were non-public HEIs; 4 were case study HEIs and 10 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

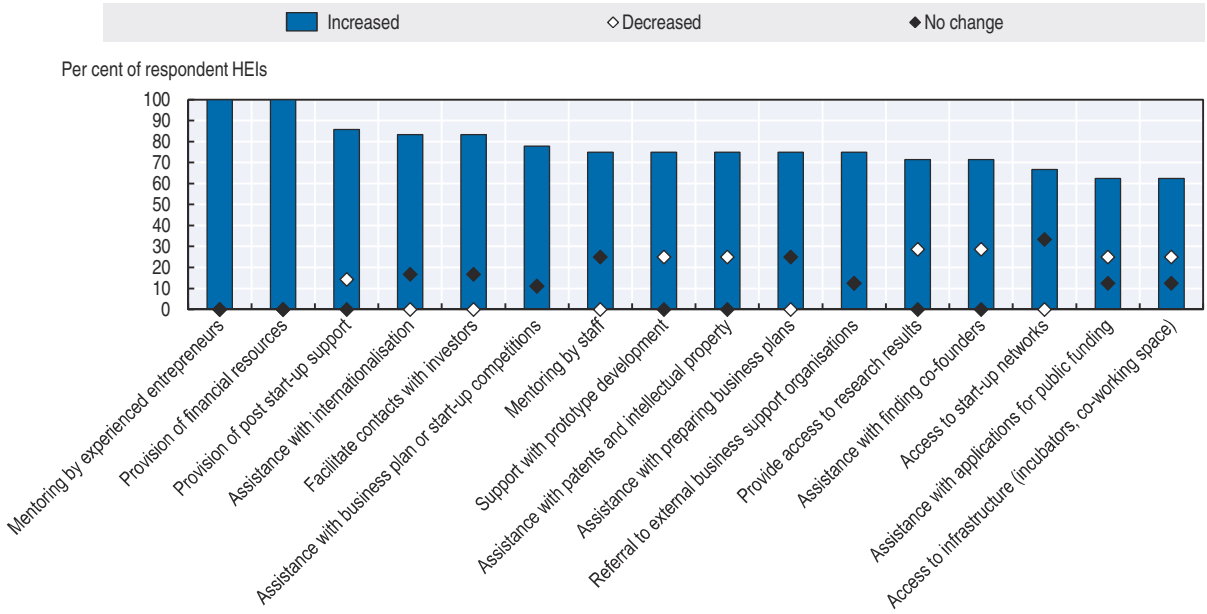
managing innovation processes. However, the entrepreneurship training and courses are still largely dedicated to hard knowledge rather than developing entrepreneurial skills and competencies. Soft skills are often acquired through out-of-class activities such as entrepreneurial events or student research centres focusing on entrepreneurship, whereas they could effectively be brought into formal classes. Teaching methods are sometimes still too much based on the traditional transmission-reception-exam model. Using more entrepreneurs and key actors from the entrepreneurship ecosystem in classes and training would improve the quality and relevance of training.

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

Mentoring by entrepreneurs does not appear to be widely used as an educational tool in Polish HEIs (see Figure 2.12). All respondents to the HEI Leader Survey reported that mentoring, along with financial support, is an area where student demand has increased over the last two years (Figure 2.13). On the other hand, examples of peer mentoring for start-up were observed in the case study HEIs in the form of student research circles, where students learn together in groups. Further, each student group has an academic staff member available to them to provide advice and mentorship. Very few examples of mentoring by entrepreneurs were observed during the study visits.

Figure 2.13. **Change in demand for start-up supports**

"How has the demand for the special support measures developed over the last two years?"



Note: Total number of respondents was 8, of which 6 were public HEIs, 2 were non-public HEIs; 4 were case study HEIs and 4 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

The HEI facilitates access to financing for its entrepreneurs

Most HEIs are not involved in new venture financing. Seed funding is however provided by the AIP seed fund and can be accessed via the AIP incubators on campus. In addition, there are examples of student organisations that are actively building relationships with investors. The student research circles at the SGH Warsaw School of Economics are active in building relationships with the business community in Warsaw and have been successful at involving venture capitalists in their events. Students can also access various funding sources off-campus, including grant schemes operated by city governments as well as national schemes. Although HEIs are not very active in this area, the students interviewed during the study visits indicated that financing is not seen as a major obstacle to business creation.

However finance does appear to be more of an obstacle for academic staff, who typically need greater amounts of financing. Many researchers and Technology Transfer Offices in the case study HEIs cited a lack of resources as an obstacle to fully protecting intellectual property developed by researchers.

The HEI offers or facilitates access to business incubation

Most Polish universities host business incubators providing entrepreneurs with an integrated package of coaching, mentoring, training, shared platforms and financing and a visible and accessible business location. However, most of the time, these incubators are not part of the university but belong to a private foundation (i.e. the AIP), and they tend to offer services that would generally be considered to be pre-incubation rather than incubation.

Off-campus business incubators are also available to students and academic staff, but funding for them has declined recently and their capacity has diminished (see Chapter 5 for more information). Nonetheless, there are exciting new initiatives to offset this such as GrowPoint at KU Kozminski University, which is a new business accelerator programme.

Key recommendations for preparing entrepreneurs

For the Ministry of Science and Higher Education:

- Work with the Ministry of Economic Development and the Polish Agency for Enterprise Development (PARP) to strengthen the start-up support infrastructure making use of European Union Structural and Investment Funds.

For HEIs:

- Increase the availability of mentoring by entrepreneurs for student entrepreneurs.
- Improve the quality of start-up supports for students, including providing more business development support.
- Develop more intensive business supports for students with high potential ideas.

2.5. Knowledge exchange

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

Polish HEIs take a committed but decentralised approach to working with the business sector, governments and other community organisations. The HEI Leader Survey shows that the majority of HEIs undertake a range of knowledge exchange activities with other actors and organisations in their local and regional contexts. The most common activities are joint research projects, student internships and continuous learning opportunities for employees in local companies. Most HEIs in Poland report that they operate these activities. Other types of collaboration are undertaken in about half of the Polish HEIs responding to the HEI Leaders Survey, including staff loans to industry and transferring knowledge through technology transfer (e.g. licensing, prototypes, spin-outs).

Furthermore, each of the case study HEIs had implemented some type of structure to support collaborations and knowledge exchanges with industry, the public sector and society, including advisory boards at institution and faculty level, technology transfer offices, career offices and special purpose vehicles to help spin-out companies. However, the majority of these activities are very small scale. For example, none of the case study HEIs had filed more than three patents in a year. Thus, while many of the structures to facilitate these activities are in place, more investment will be needed to kick-start these activities.

The case study HEIs also identified a number of other challenges that inhibit them from further exploiting their knowledge exchange activities. First, there is a disconnect between the higher education sector and the business community. There are many examples of the business community seeking expertise from HEIs but expecting results in unrealistic timeframes (from the HEIs' perspective). Second, many of the activities are driven by the individuals involved who hold key positions within the HEIs. There is a need to ensure that take-up of these structures is systemic. Third, the HEIs are relatively closed to two important sources of international connections, namely foreign students and foreign or visiting academic staff. This inhibits international knowledge exchanges.

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

Each of the case study HEIs has a range of partnerships with private companies, local government, regional development agencies and other HEIs. These partnerships and relationships have an equally broad range of objectives. Collaborations with private companies were often short- and medium-term research projects, often focused on commercialising applied research from the HEI. This was particularly true for universities of applied sciences. Similarly, there were several examples of student projects that provided opportunities to work with companies. There are also examples of where the HEIs contribute to local entrepreneurship events. For example, in Elblag, the University of Applied Sciences works with the city to plan and organise Elblag Days of Entrepreneurship, Open Days (where companies hold open houses) and Global Entrepreneurship Week.

Polish HEIs tend to take a decentralised approach to building partnerships, where academic staff and the various units develop relationships with key partners. Some HEIs also use formalised structures, such as advisory boards that allow the business community and regional government an opportunity to shape HEI activities.

An area where the HEIs are less strong is maintaining relationships with their graduates. Alumni can be an important resource for advancing the entrepreneurial agenda, including providing potential guest trainers who can work with students, providing more experienced coaches and mentors for student entrepreneurs, offering professional network opportunities between the business community and higher education, and acting as a potential source of financing for entrepreneurial activities. Career offices are working to improve these contacts by building up alumni associations and by creating newsletters to maintain contact with graduates.

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

Polish HEIs generally have strong connections with business incubators and science parks. Approximately half of respondents to the HEI Leader Survey indicated that they work with business incubators both for entrepreneurship education and to support new start-ups by staff and students (Figure 2.14). Only 20% of HEIs reported that they do not work with incubators.

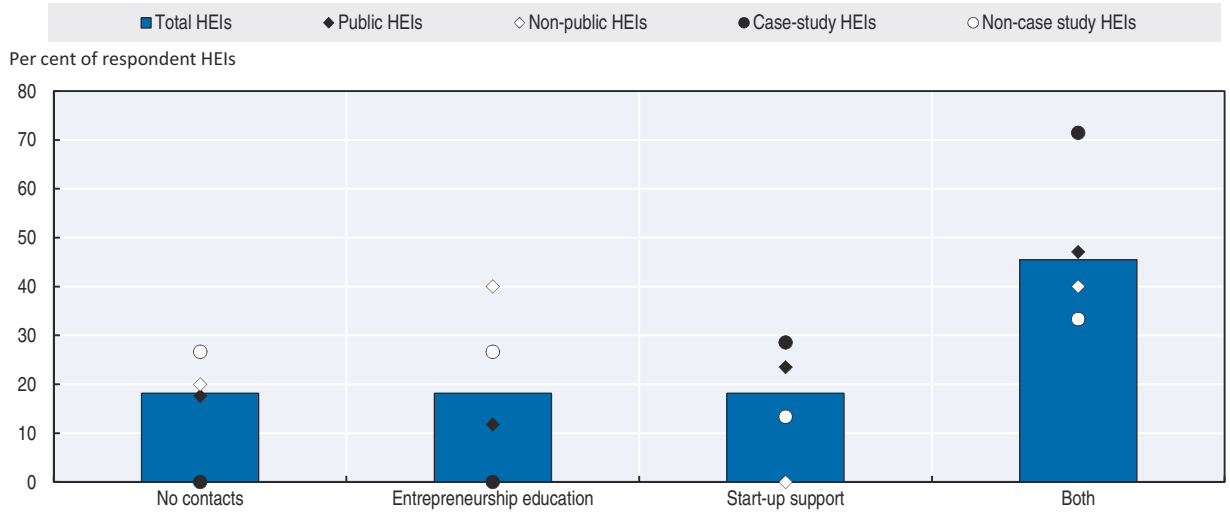
Two-thirds of respondents indicated that they have incubators on-campus. Of those who reported on-campus incubators, all reported that they provided access to the HEI's laboratories and research facilities; access to the HEI's IT services (Internet, network services, etc.); coaching and training; and help with internationalisation (Figure 2.15).

Start-up support for students is largely provided through the network of AIP incubators, which are typically managed by the AIP Foundation and not the HEIs. There are 56 AIP incubators in the network.

The HEIs often provide start-up support for academic staff to help them commercialise their research. This support includes assistance with managing intellectual property protection and special purpose vehicles to set up legal entities. Academic staff at the case study HEIs were generally content with this support but it is all very new and the levels of activity are very low. None of the case study HEIs have created more than three spin-outs per year. Funding is a challenge for the HEIs in this area and a lack of funds is often prohibitive in terms of international patent filing.

Figure 2.14. **Technology parks and incubators**

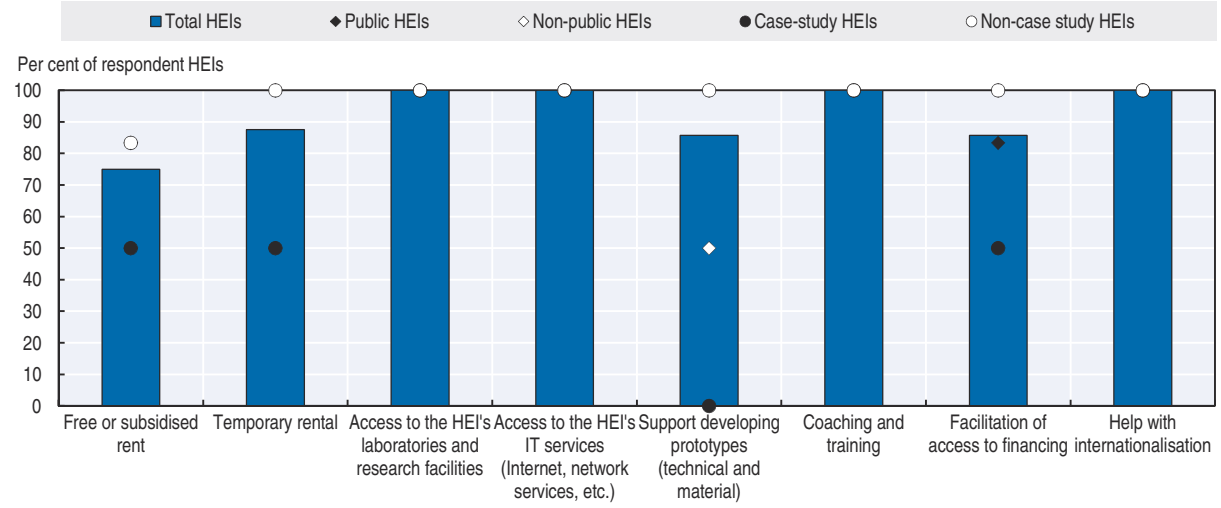
"Does your HEI maintain strategic contacts with technology parks and incubators?"



Note: Total number of respondents was 22, of which 17 were public HEIs, 5 were non-public HEIs; 7 were case study HEIs and 15 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

Figure 2.15. **Incubation services**

"Which of the following services are offered in the incubation facilities?"



Note: Total number of respondents was 8, of which 6 were public HEIs, 2 were non-public HEIs; 2 were case study HEIs and 6 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

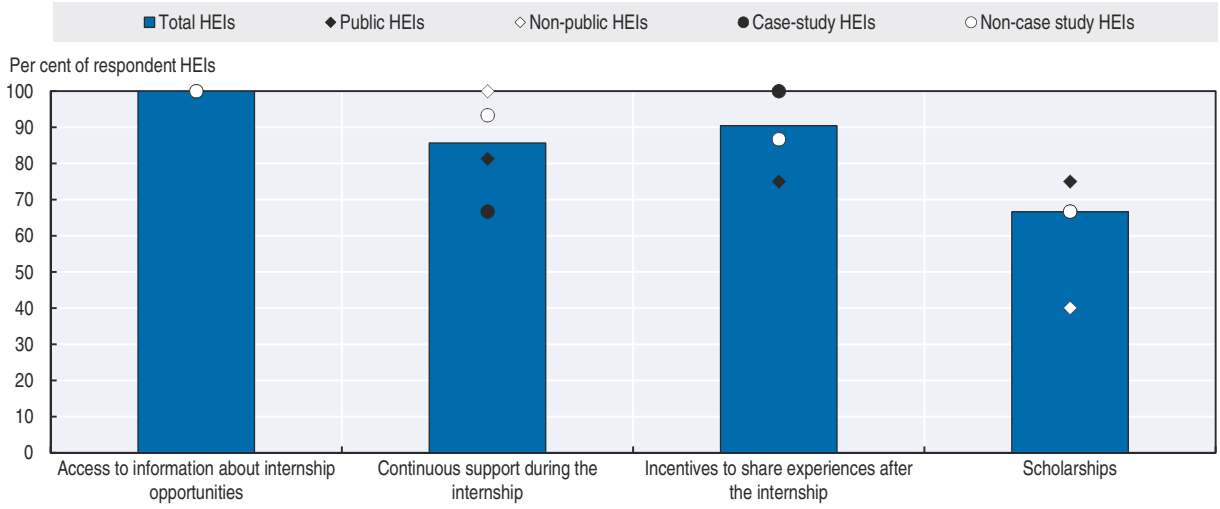
In addition, there is an extensive start-up support infrastructure that is managed by the Polish Agency for Enterprise Development (PARP). This includes business incubators, science parks and technology parks. They are not always strongly linked with HEIs, but there are examples of close relationships such as Lublin Science and Technology Park and UMCS Maria Curie-Sklodowska University.

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

HEIs offer students several opportunities to participate in innovative activities with non-university stakeholders. One of the most common methods is through internships, which are notably common practice in technical universities. The HEI Leader Survey indicates that more than 80% of internship programmes include a mechanism for participants to share their experiences with other students (Figure 2.16).

Figure 2.16. **Internships**

"What does the internship programme include?"



Note: Total number of respondents was 21, of which 16 were public HEIs, 5 were non-public HEIs; 6 were case study HEIs and 15 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

In addition, student research circles are extremely important in Polish HEIs. These student clubs are organised and operated under the guidance of a professor. Student research circles are not necessarily about academic research; they can have any purpose. Many of them facilitate student engagement with the business community (e.g. student business clubs).

Finally, students are also active in entrepreneurship activities in the community. There are examples such as the PWSZ State University of Applied Science in Elblag, which supports student involvement in the Global Entrepreneurship Week in Elblag.

There are fewer initiatives for staff outside of research projects. However, there are a small number of examples such as the Operational Programme – Knowledge Education Development (PO WER), where HEIs helped develop professionals with specific skills for industry. This initiative is managed by the Ministry of Science and Higher Education.

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

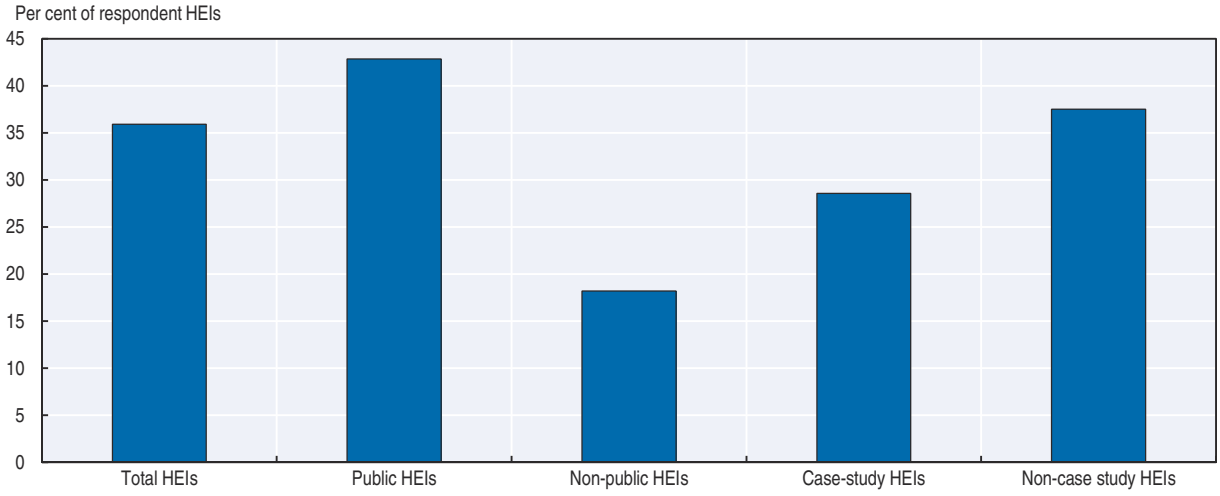
There are a number of examples of projects where HEIs bring together research, education and the business community. One good example is the Ecotech-Complex in Lublin. Under the leadership of UMCS Maria Curie-Sklodowska University, the project involves other HEIs in the region: Lublin Medical University of Lublin, Institute of Agrophysic

Polish Academy of Sciences in Lublin, Rzeszow University of Technology and University of Rzeszów. This project aims to consolidate the research, educational and industrial potential of Lubelskie and Podkarpackie regions to improve innovation and competitiveness of the regional economy in the areas of sustainable agriculture, environment protection, health and food safety. The complex offers 20 laboratory spaces for academic researchers, PhD students and private sector researchers. It also offers training and internships for students. Another good example is the new Centre for Innovation and Technology Transfer Management of WUT Warsaw University of Technology (see Chapter 5 for more information).

On the other hand, linkages between HEIs and the business community are relatively limited. One of the challenges that several HEIs noted was that joint research and projects with the private sector cannot be published in academic publications due to confidentiality concerns and questions of intellectual property. The HEI Leader Survey confirmed that there are few incentives available for staff to engage in these activities (Figure 2.17).

Figure 2.17. **Staff incentives for knowledge exchange**

"Does the HEI have an incentive system for staff to contribute to the HEI's knowledge exchange activities other than through commercialisation of research results?" (response = yes)



Note: Total number of respondents was 25, of which 20 were public HEIs, 5 were non-public HEIs; 7 were case study HEIs and 18 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

Key recommendations for knowledge exchange

For the Ministry of Science and Higher Education:

- Work with the Ministry for Economic Development to provide incentives for private sector companies to work with HEIs.
- Promote and animate the network that was established for academic staff and technology transfer officers who have participated in the Top 500 Innovators programme.

For HEIs:

- Incorporate a strong entrepreneurial element in HEI and faculty advisory boards.
- Continue to invest in strengthening relationships with alumni.
- Increase incentives for academic staff to work with private sector companies.

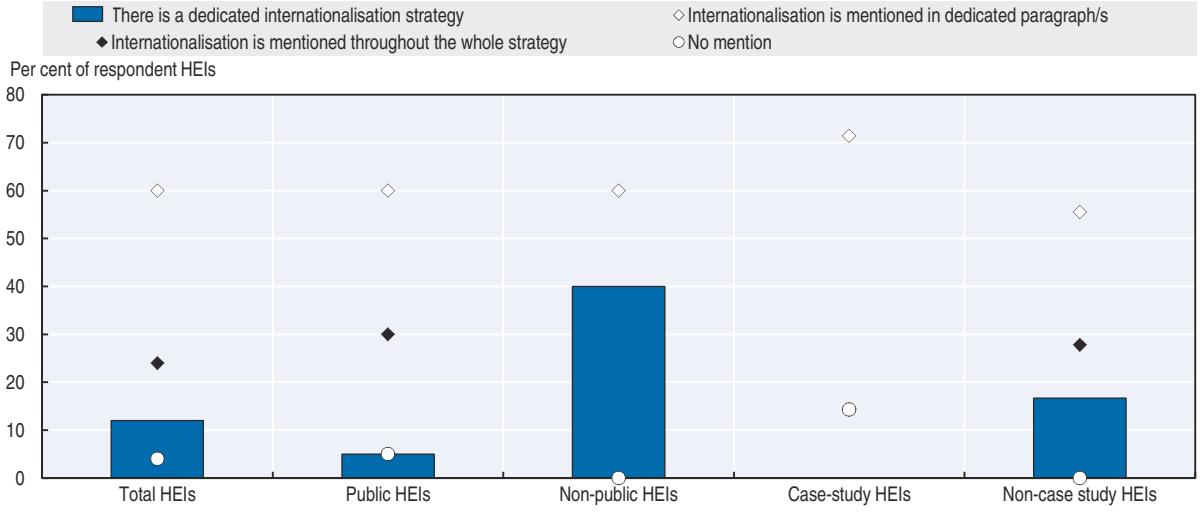
2.6. The internationalised institution

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

Nearly all respondents to the HEI Leader Survey reported that their HEI's strategy has sections dedicated to international activities or that international issues run throughout the strategy (Figure 2.18). Moreover, a small number of HEIs reported that they had a stand-alone internationalisation strategy, the vast majority were non-public HEIs. The strong presence of internationalisation in HEI strategies suggests that internationalisation is an important issue in Polish higher education. This is, however, because the scale of international activities of Polish HEIs is quite limited. These activities are typically limited to modest efforts related to student recruitment, student exchanges (e.g. Erasmus+), academic exchanges (e.g. Top 500 Innovators Programme) or international research projects.

Figure 2.18. **Internationalisation strategies**

"Is internationalisation part of your HEI's strategy?"



Note: Total number of respondents was 25, of which 20 were public HEIs, 5 were non-public HEIs; 7 were case study HEIs and 18 were not case study HEIs.

Source: OECD (2016), *OECD HEI Leader Survey Poland*.

On the other hand, there were few international members of advisory boards or other international contributions to the governance structures of the case study HEIs. The one exception was at KU Kozminski University, which had an international advisory board. Spreading this practice to other HEIs in Poland would help other Polish HEIs in becoming more international.

Another approach to advancing in this area is to increase the participation of academic staff in international entrepreneurial related events or networks (e.g. HEInnovate events, CONEEECT, ASTPPROTON).

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

Polish HEIs are making efforts to increase international mobility of staff and even more so for students. There are now ten times more international students than there were 10 years ago. However, international students account for only 3% of the overall student population, and a substantial part of these foreign students come from a rather small

number of neighbouring countries (e.g. Ukraine). The limited number of courses and programmes offered in English inhibits the growth of the number of international students in Poland, although Polish HEIs are increasing the number of courses and programmes offered in English.

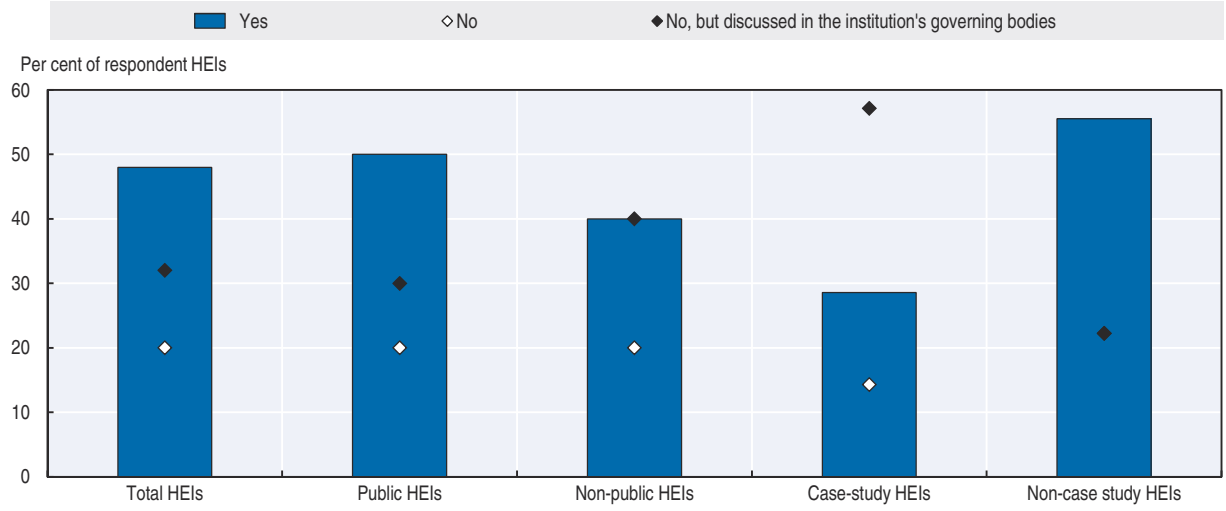
There have been recent positive experiences with international exchange programmes (e.g. Top 500 Innovators, Young Design Management, Eco-innovations in cities). These exchanges allowed academic staff to learn and share experiences with leading HEIs in other countries in the areas of innovation and entrepreneurship. One of the strengths of many of these programmes is that they included a mechanism for disseminating this knowledge once the participants returned to Poland. The results of these exchanges were observed in the case study HEIs, notably at the GUT Gdansk University of Technology and the SGH Warsaw School of Economics. Many professors expressed disappointment that these programmes have been discontinued since they are seen as having had a positive impact. The discontinuity of these types of programmes will reduce the medium and long-term impact of such exchanges.

The HEI seeks and attracts international and entrepreneurial staff

Very few academic staff are from outside of Poland and visiting professorships do not appear to be widely used (see Figure 1.8 in Chapter 1). The HEI Leader Survey indicates that nearly half of respondents have recruitment policies and practices that seek to attract international staff (Figure 2.21) but the results of such efforts have been extremely limited. One of the challenges is that the vast majority of courses and programmes are offered in Polish, which is clearly a challenge for non-Polish academics. However, another important challenge that was identified during the study visits is that the salaries of academic staff are not competitive internationally. It is important to note that while there are national regulations on salary levels, the HEIs have flexibility in setting salary levels.

Figure 2.19. **Attracting international academic staff**

"Does your HEI have recruitment policies and practices that seek to attract international staff?"



Note: Total number of respondents was 25, of which 20 were public HEIs, 5 were non-public HEIs; 7 were case study HEIs and 18 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

A number of approaches can be taken to increase the presence of international and entrepreneurial academic staff. First, fellowships can be used to attract international scholars to share knowledge and participate in teaching or research activities related to innovation and entrepreneurship. A common mechanism for doing this is to create Entrepreneurship Chairs. None of the case study HEIs had experience with this.

Further, international linkages can be strengthened through international collaborative research projects, as well as masters and PhD thesis projects. In particular, the community of PhD students (approximately 40 000) can play a role in this regard.

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

A number of actions over the past decade have sought to increase international perspectives in the approaches taken to teaching in Polish HEIs. These include the numerous exchange programmes for academic staff to go abroad to learn from leading foreign HEIs and the use of student exchange programmes to bring international perspectives into classes via students. Despite these efforts, one of the barriers is the low level of English course and programme offerings. This limits the use of international academic staff in teaching as well as non-Polish guest teachers. Moreover, this inhibits knowledge exchanges and teaching collaborations.

A number of actions can be taken to further incorporate international perspectives in teaching, including: i) greater participation of academic staff in international entrepreneurship teaching networks; ii) participation of Polish expatriates in seminars or other teaching activities; iii) participation of alumni leading internationally oriented spinoffs or managing multinational companies in seminars or other teaching activities; iv) participation of academic staff and students in international pitch, business ideas or business plan competitions; v) establishment of temporary chairs for international entrepreneurship professors to work in Poland for a certain period of time and provide teaching in the fields of innovation and entrepreneurship, both to students and academic staff.

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

Polish HEIs and their academic staff are generally active in international research projects in some disciplines (e.g. physics, chemistry, engineering). This most often occurs through joint research projects with HEIs from other countries and also with multinational corporations in some cases.

Despite this high level of activity, further collaborations are actively sought. One of the mechanisms used to increase international research is through European Union Structural and Investment Funds and through HORIZON 2020 Funds. In addition, all of the HEIs visited are working to build stronger relationships with internationally oriented companies, notably in the fields of innovation and entrepreneurship.

Key recommendations for internationalisation

For the Ministry of Science and Higher Education:

- Create communities of good practice that include non-Polish academic staff and experts. The focus of these networks could cover: teaching and learning; career offices; technology transfer offices; business accelerators and incubators; and more.

For HEIs:

- Invite international experts to give short training sessions to academic staff on issues relevant to innovation and entrepreneurship (e.g. teaching entrepreneurship).
- Create Visiting Fellow positions related to innovation and entrepreneurship to allow international academic staff to work in Polish HEIs for a short period of time (one to three months).

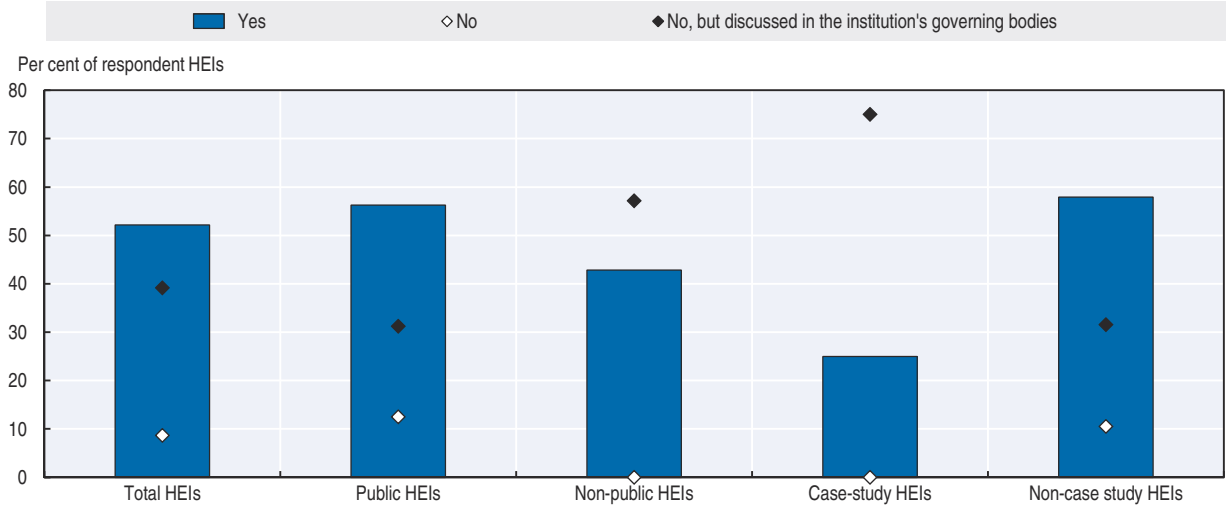
2.7. Measuring impact

The HEI regularly assesses the impact of its entrepreneurial agenda

Overall, HEIs do not systematically evaluate their entrepreneurial activities. This, however, is not unique to entrepreneurial activities. Figure 2.20 shows that only half of responding Polish HEIs monitor specific performance indicators defined for their institutional strategies. Thus, monitoring and assessing HEI strategies is a broad challenge.

Figure 2.20. **Performance indicators for HEI strategy**

"Are there specific performance indicators for the strategy's objectives, which are regularly monitored?"



Note: Total number of respondents was 29, of which 22 were public HEIs, 7 were non-public HEIs; 7 were case study HEIs and 22 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

Polish HEIs operate a wide range of entrepreneurial activities. However, as seen in section 2.1, they are not always explicitly identified in strategic documents. This presents a challenge for measuring the impact because there is rarely a clearly defined set of activities that can be assessed to measure institutional performance.

At the institutional level, senior management are often interested in tracking the number of partnerships with industry and international co-operations. All of the case study HEIs had detailed descriptive information on these activities but none attempted to assess the impact of these activities on the HEI.

There are some efforts to track and measure entrepreneurial activities within various units in HEIs. For example, career offices typically track their entrepreneurship training sessions and the labour market outcomes of graduates. In addition, many entrepreneurship

professors in the case study HEIs survey students before and after entrepreneurship education modules and training courses to attempt to measure the impact of their teaching. It is also common for business start-up supports (e.g. AIP incubators) to track the number of participants and the number of start-ups. However, these efforts are not consolidated, nor utilised at the institutional level.

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

Polish HEIs do not appear to put much effort into assessing how personnel and financial resources are used to support their entrepreneurial agenda. Most HEIs have an idea about how many people are involved in these activities and are also aware of the financial resources invested, since public funding often has conditions on their use. However, there are few examples of an HEI attempting to assess whether human and financial resources are used in the most effective and efficient manner to support its entrepreneurial agenda.

Within HEIs, some units do undertake informal assessments of the ways in which their resources are used. For example, career offices often had only one to three employees and therefore have to decide how these staff will be employed. This requires an informal assessment of which activities the career offices should do, based on student demand.

The challenge for HEIs in undertaking more rigorous assessments of how their human resources are employed is that entrepreneurial activities are not considered by the processes that determine the career paths of academic staff. Thus little attention is often paid to them.

The HEI regularly assesses entrepreneurial teaching and learning across the institution

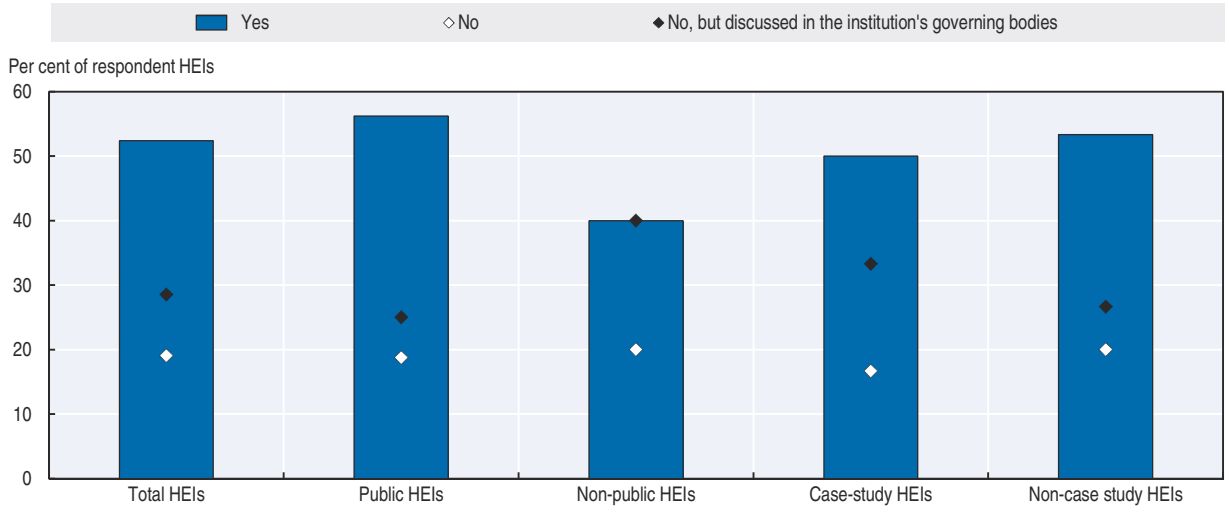
The HEI Leader Survey indicates that approximately half of respondents undertake formal evaluations of entrepreneurship education activities (Figure 2.21). Of these, half of these respondents indicated that the formal evaluation is mandatory. These evaluations relied heavily on student surveys but few use follow-up interviews and focus groups to collect more detailed information. Evaluations typically measured: number of participants in training; satisfaction of participants; motivation of participants to start-up a business; and level of competences and skills gained in the education activity.

Many examples of informal assessments of entrepreneurship education were observed in the case study HEIs. A typical approach involves professors teaching entrepreneurship making a survey of their students at the beginning of the course to assess their attitudes, knowledge and motivations in entrepreneurship, and then running the same survey again at the end of the course to identify the changes in students' attitudes and views, which are likely attributed to the course. 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.

More generally, the Polish Accreditation Committee (PKA) assesses learning outcomes in the higher education system in a collaborative process with HEIs. Several entrepreneurship learning outcomes are included in the National Qualifications Framework for Higher Education and are therefore covered by these assessments. PKA undertakes approximately 400 *ex-post* assessments per year.

Figure 2.21. **Evaluating entrepreneurship education**

"Is there a formal evaluation of the entrepreneurship education activities?"



Note: Total number of respondents was 21, of which 16 were public HEIs, 5 were non-public HEIs; 6 were case study HEIs and 17 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

The HEI regularly assesses the impact of start-up support

The HEI Leader Survey indicates that HEIs put less attention on assessing business start-up support than they do for entrepreneurship education activities (Figure 2.22). Only one-third of HEIs indicated that they undertake formal evaluations of start-up support measures. This is largely explained by the role of the AIP Foundation in operating its network of AIP incubators inside HEIs. The AIP Foundation is a separate organisation that has agreements with HEIs to operate its incubators inside HEIs. Therefore, it is the AIP Foundation that assesses their centres rather than the HEIs. Visits to the AIP incubators in the study visits confirmed the collection of basic metrics on their activities.

In all the case study HEIs a basic but rather comprehensive set of metrics is collected on start-up support services (e.g. special purpose vehicles for spin-outs, technology transfer centres) for researchers and academic staff. This includes, for example, the number of patents filed in Poland and internationally and the value of spin-outs. However, this information does not appear to be used to assess the impact of the investments in these support services.

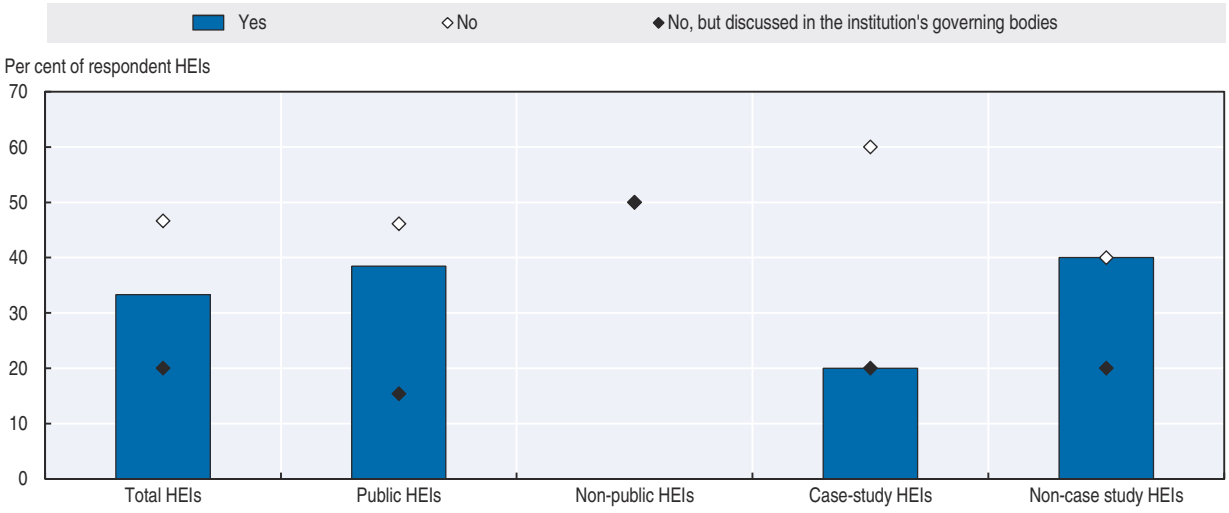
The HEI regularly assesses knowledge exchange and collaboration

HEIs are very aware of the ways in which they interact with other private and public sector organisations. Results from the HEI Leader Survey indicate that the vast majority of HEIs undertake formal evaluations on their range of knowledge exchange activities, including various forms of technology transfer, research collaborations, teaching activities of non-university actors, etc.

All of the case study HEIs had detailed metrics on the number of collaborative research projects, the number of patents, the value of spin-outs, the number of staff and students involved in exchanges and more.

Figure 2.22. **Evaluating start-up support**

"Is there formal evaluation of the special support measures?"



Note: Total number of respondents was 15, of which 13 were public HEIs, 2 were non-public HEIs; 6 were case study HEIs and 17 were not case study HEIs.

Source: OECD (2016), *OECD HEI Leader Survey Poland*.

There is room, however, for the HEIs to go beyond collecting data on key indicators by undertaking more sophisticated impact evaluations to understand the value of these activities to the HEI, including an identification of which activities are the most valuable.

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

The case study HEIs all track their international activities with considerable detail. Each of the HEIs could report the number of collaborative research projects with private sector businesses and with other HEIs, both in Poland and abroad. Further, they also track the number of staff and student exchanges (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.

Key recommendations for measuring impact

For the Ministry of Science and Higher Education:

- Encourage HEIs to measure the impact of their innovation and entrepreneurship activities and offer technical support (e.g. training) to the HEIs, including through opportunities available through the European Social Fund.
- Provide a prize with funding for HEIs that can demonstrate a strong impact of their innovation and entrepreneurship activities.

For HEIs:

- Undertake more sophisticated evaluations and impact assessments on all elements of the entrepreneurial agenda.
- Develop baseline measures relating to key performance indicators so that the impact of the entrepreneurial agenda can be measured. Key indicators should include (but not be limited to): number of student participating in entrepreneurship activities (e.g. formal

courses, workshops, AIP incubators); number of spin-offs and start-ups by academic staff and students; number of collaborations with industry for infrastructure development; and percentage of third-party funding from industry.

References

OECD (2016), *OECD HEI Leader Survey Poland*.

Chapter 3

Enhancing leadership and governance in Poland's higher education institutions

This chapter provides an in-depth discussion of leadership and governance in higher education institutions in Poland related to promoting and supporting the entrepreneurial university. This includes highlighting good practice leadership and governance examples and models in Poland, as well as the key leadership and governance barriers to strengthening entrepreneurship support. It also provides recommendations for higher education institutions and for public policy.

3.1. Introduction

Strong leadership and governance are critical to the creation and development of "entrepreneurial universities" by providing support and incentives for entrepreneurship and innovation activities and ensuring that such activities are undertaken in a structured and systemic manner, rather than being sporadic or relying too heavily upon the personal initiative of any set of individuals. Leadership and governance is one of the main pillars of the HEInnovate framework. This framework identifies and number of good practices in the area of leadership and governance of higher education institutions (HEIs), supported by recent research (e.g. Graham, 2014) that assesses how leading "entrepreneurial universities" manage their ambitions, activities and results in this area. Common features of these higher education institutions (HEIs) include:

- Well-connected networks of entrepreneurship champions;
- Public endorsements by senior management;
- A supportive context provided by regional and national governments;
- Strong relationships built on trust with the regional entrepreneurship and innovation community;
- An active student entrepreneurial movement; and
- The ability to create a market for university entrepreneurship.

Recent reforms in the Polish higher education system have strengthened many of these features of HEIs in Poland. These reforms include the 2011 and 2014 changes in the Law on Higher Education. Combined, they attempt to radically change the model of higher education with new objectives and activities, such as: i) raising external revenues for HEIs; ii) increasing the participation of external stakeholders in HEIs' activities and curriculum development; iii) providing incentives for academic staff to create spinoffs; iv) increasing the commercialisation of research results; v) including entrepreneurship skills in the National Qualifications Framework for Higher Education; vi) adjusting education programmes and courses to the social and economic needs of Poland; vii) increasing the impact of higher education and HEIs on the social, economic and international environment; viii) providing additional public funding for HEIs that demonstrate strong links with the social and economic environment; and ix) tracking alumni and graduates' employment levels.

These reforms are largely government-driven, demonstrating leadership for a move towards a more entrepreneurial and innovative higher education sector. The changes provide HEIs with the potential to adopt new models for HEI leadership appointments (e.g. to enable candidates from outside the respective university to apply for rector posts, or to have external stakeholders participate in the election process, as is the case in other countries), or create specific qualified offices to lead innovation and entrepreneurship initiatives, including exposure for some of their staff to international best practices (e.g. Top 500 Innovators programme). HEIs are also increasingly encouraged and expected to demonstrate leadership in their communities.

The Polish higher education system is quite heterogeneous, with a large number and wide variety of more than 400 HEIs, with different natures, scopes and surrounding environments. Regardless of their nature, all HEIs can be entrepreneurial and make contributions to their communities. While HEIs can have a common roadmap of possibilities in this area, there is not, and neither should there be, a "one size fits all" response for the way each particular HEI positions itself, sets priorities and defines how it wants to be entrepreneurial.

3.2. Analysis and findings

Many actors at the national level create opportunities but also co-ordination challenges

Any choices regarding leadership and governance models need to take into account the existing actors that have a role in the creation of entrepreneurial HEIs in Poland. At the national level, there are many stakeholders in the higher education system. Table 3.1 presents a list of stakeholders that are engaged with HEIs in activities related to innovation and entrepreneurship in Poland. Having a broad view of the key actors helps in the construction of entrepreneurial and innovative HEIs, since effective interactions will need an appropriate governance model with proper interfaces.

Table 3.1. **The main national stakeholders for entrepreneurial HEIs**

Academic Network of Entrepreneurship Educators
Alumni
Association of HEI Career Offices
Association of HEI Industrial Property Offices
Association of HEI Technology Transfer Offices
Business Angels
Central Statistical Office of Poland
Companies with Large R&D Activities
Company Accelerators
Conference of Rectors of Academic Schools in Poland
Conference of Rectors of Vocational Schools in Poland
Conference of Vice-Rectors for Innovation and Entrepreneurship
Entrepreneurs (including young entrepreneurs, science-based entrepreneurs, social entrepreneurs and serial entrepreneurs)
Foundation for Polish Science
Foundation of Academic Incubators of Entrepreneurship
Gazelle Companies
General Council of Science and Higher Education
High Growth Companies
Innovative and Entrepreneurial Academic Staff Members
Inventors and Patent Holders
Mayors
National Centre for Research and Development
National Science Centre
Network of HEI Special Vehicle Companies for Supporting Spinoff Creation and Development
NGO with Relevant Activities in the areas of Innovation and Entrepreneurship
Other Incubators or Co-work Facilities
Parliament of the Students of the Republic of Poland
PhD students union representative
Polish Accreditation Committee (PKA)
Polish Agency for Enterprise Development
Polish Business Innovation Centres Association
Polish Information and Foreign Investment Agency
Polish Patent Office
Polish Rectors Foundation

Table 3.1. **The main national stakeholders for entrepreneurial HEIs** *(cont.)*

Prime-Minister, Minister of Science and Higher Education and Other Ministries (e.g education, employment, economy, regional development, finances)
Provinces (Government at the Voivodship-level)
Schools and Teachers from other Levels of Education
Science-based Incubators
Science Parks
SME
Spinoff Companies
Start-up Poland Foundation
Student Research Societies Representative
Venture Capitalists

That so many useful players have been identified is a positive sign about the present dynamics and interested parties that can have a role in building a more entrepreneurial higher education system. Some of these actors are dispersed across Poland and its regions, although with different levels of performance, maturity and activities. They do provide a good underlying organisational infrastructure for Polish HEIs to rely on to accomplish their entrepreneurial ambitions. They are potential partners that, with proper choices and adaptations, may be asked to provide support to the HEIs' entrepreneurial agendas. They may also be called on to participate in the governance models of HEIs. Given the specific mission and surrounding environment of any specific HEI, an appropriate group of selected stakeholders, reflecting some of the types of players identified above, can be invited to participate in the HEIs' leadership and governance models.

At the same time, the large number of stakeholders creates a need for careful management since there is great potential for duplication of efforts. Such duplication was observed on several occasions during the study visits and some of the ongoing initiatives were not aware of each other.

There is therefore a need to ensure a multi-level and multi-perspective co-ordination of existing actors and initiatives, combining both top-down and bottom-up contributions. The objective should be to create synergies and consolidated learning communities with high degrees of interaction while avoiding duplications. It is important to create a system where objectives are shared across stakeholders to create a consistency of purpose. A good example of such a multi-level view and implementation involves the multiple contributions and interactions surrounding the UMCS Maria Curie-Sklodowska University (Box 3.1).

Box 3.1. **Multi-level innovation, UMCS Maria Curie-Sklodowska University**

The UMCS Maria Curie-Sklodowska University, in Lublin, provides an example of a coherent innovation strategy linked with other regional actors, and defined and managed under a multi-level approach, going all the way from the region to the individual activities of any particular UMCS Faculty, but always with strong UMCS participation.

The Lubelskie region developed its Regional Innovation Strategy for Smart Specialisation (RIS3) considering national policies and the strengths of the region's HEIs, including UMCS. Taking into account available resources and assumed priorities, the strategy points to four areas of smart specialisation (which are also highlighted in the UMCS strategy): i) bioeconomy; ii) medicine and health; iii) information technology and automation; and iv) low-carbon emission energy production. Through the strategy, the region aims to improve

Box 3.1. **Multi-level innovation, UMCS Maria Curie-Sklodowska University** *(cont.)*

its regional innovation performance, and also to: i) effectively use its endogenous potential; ii) create high added value products and services; iii) be open to innovation; and iv) co-operate and link with the outside world economically and scientifically. For that to happen, the following objectives are considered: i) developing territorial capital, especially in the areas of smart specialisation; ii) strengthening the regional research and innovation system to be based on the quadruple helix that joins together all stakeholders interested in the co-operation; iii) incorporating the region into the national as well as international chain of innovation and co-operation network; iv) developing effective instruments to support innovation and competitiveness of the regional economy; and v) stimulating dynamic advantages of the location. With clear targets and well-defined programmes to implement it, this strategy relies a lot upon the 97 research institutions located in the region, with UMCS being one of the strongest contributors. To support the implementation of this strategy, a governance model was adopted that comprises the Board of the Region, a Council for Innovation, and a Managing Authority.

At the city level, Lublin identifies itself as being a "City of Inspiration", with nine HEIs and significant involvement from UMCS. Even within its municipality organisational structure, the city has a Strategy and Investor Relations Department to support innovation. It has the following divisions: i) investor relations; ii) academic relations; iii) entrepreneurship support and co-operation with business; iv) strategy and socio-economic analysis; and v) marketing.

Another important actor in Lublin is the Lublin Science and Technology Park, which has a variety of functions, including; i) incubation of nearly 20 start-ups; ii) company related laboratories; iii) co-working spaces; and iv) training and conference halls, space for exhibits and events.

It is under the scope of such a multi-level innovation environment that UMCS undertakes a wide range of innovation and entrepreneurship activities to meet the specific goals and priorities contained in its own strategic development plans. The university goals and plans recognise the importance of relationships with the regional economy, including: i) providing information about the UMCS activities; ii) building a positive image about UMCS; iii) using the potential of the UMCS to promote the regional economy; iv) creating a consistent scientific research agenda; and v) receiving valuable inputs for the development of curricula. Among the many entrepreneurial activities carried out by UMCS and its Faculties, the following may be mentioned as examples: i) creation of spinoff companies; ii) patent registration; iii) collaborations with SME and large companies; iv) international activities, including academic units that specialise in studying and promoting the culture of given countries, such as China or Portugal; v) existence of a media and art incubator, as well as important participation in Lublin cultural activities; vi) regular collaboration with public administration at different levels and working for a wide variety of entities; and vii) support to entrepreneurs and their projects, as well as free services provided to low income students.

To implement this entrepreneurial agenda, UMCS counts on a number of different units and consortia, including; i) a decisive role played by its own Centre for Innovation and Commercialisation of Research, whose mission is to promote "knowledge exchange and co-operation with socio-economic environment"; ii) collaboration with other organisations, such as the Foundation for Lubelskie Development, which includes a Cluster of Business Support with 17 institutions that create joint projects, provide training and coaching, as well as business angels investments; iii) creation of consortia, addressing large scale and multidisciplinary issues, such as the recently launched Ecotech-Complex;

Box 3.1. **Multi-level innovation, UMCS Maria Curie-Sklodowska University** *(cont.)*

and iv) active participation in 14 clusters, including information and communication technologies, Lublin Econ-Energy/Medicine/Business Environment Institutions, Advanced Air Technology, Biotechnology, Design and Fashion, Eastern Poland Geo-information, and Photonics and Optical Fibres.

A recent example of this approach is the Ecotech-Complex, which promotes interdisciplinary research for advanced environmental friendly technologies, involving UMCS but also a number of other partners. With an investment of approximately EUR 40 million, it is expected to have over 100 people working there, spread over 20 different laboratories, addressing challenges such as: i) eco-materials and technologies; ii) novel bio-fuels and bio-fertilisers; iii) waste management and sustainable solutions; and iv) new environmental hazards management approaches. Amongst other advanced research equipment, it will have seven Tesla Magnetic Resonance unit available for clinical research (there are only about 50 of these facilities in the world).

HEIs typically have strong leadership but leadership continuity is a concern

HEIs have different degrees of ambition and participation in the entrepreneurial agenda. This is true across all countries. In Poland, there are examples of HEIs where leaders have largely reacted to new challenges raised by national policies, but others that have carried out substantial changes on their own initiative. By realising the relevance of third mission goals and activities they can create additional benefits for the economy and society. A good example is the PWSZ State University of Applied Science in Elblag, which has a high level of interaction with its community (Box 3.2).

Box 3.2. **A strong local innovation ecosystem driver, The PWSZ State University of Applied Science in Elblag**

Under the strong leadership of its Rector, the PWSZ State University of Applied Science in Elblag, has been successful in promoting and actively contributing to the local innovation ecosystem in Elblag.

Co-operation with external companies is very intensive. This includes the participation of companies in teaching activities and agreements with important local companies (e.g. ALSTOM, METROTEST, MAAG Zamach, OpenGieka, METRAL-EXPERT, PARTEX) to make their laboratories available for hosting classes, enabling students from various courses to learn in real world application environments.

External organisations are represented on the university's advisory board, which is composed of 20 people and chaired by a successful alumnus and entrepreneur. It meets on a regular basis (at least every three months), providing feedback and suggestions to the Rector and his team. This advice is well-received and used by the university's leadership.

There are easy triple helix collaborations between the university and a wide range of relevant stakeholders (e.g. the local authority, science park, companies, clusters and NGOs mostly involving alumni). Strong institutional collaboration has also been established with Regional Labour Offices, including full access to their databases and knowledge on job market needs and trends, thus contributing to high employment levels for graduates.

Box 3.2. **A strong local innovation ecosystem driver, The PWSZ State University of Applied Science in Elblag** *(cont.)*

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The role the university plays in local economic development is highlighted by the indicators in the international Multirank platform. For example, over 74% of student internships are in the region, there are more than one thousand active agreements and contracts with external entities, and at least 50% of the university's academic staff has practical professional experience in corresponding fields of expertise (over 30% have part-time working affiliations outside of the university).

Entrepreneurship skills are promoted and have been translated into the creation of start-ups by alumni, including entrepreneurship courses offered for certain sectors in which students have established businesses (e.g. IT, new kindergartens, security related activities).

At the same time, there are challenges in ensuring that this leadership is institutionalised. There is a need to ensure that regardless of possible changes of individual leaders (e.g. rectors, deans, agency presidents, and mayors) there are structured and systemic approaches to maintain the initiatives and linkages that are forged by HEI leaders. This likely requires professional offices to carry out collaboration on an ongoing basis so that evolutions and progress become sustained and sustainable, and irreversible.

Public HEIs have less involvement with external stakeholders than non-public HEIs

There is scope to increase the involvement of external stakeholders supporting the entrepreneurial agenda of HEIs. As shown in Figure 3.1, non-public HEIs in Poland tend to have stronger ties with external stakeholders and the business community than public HEIs.

It is also important to unify internal stakeholders so that they work together towards a common set of objectives. The entrepreneurial vision at most HEIs tends to focus on key target groups such as academic staff and researchers but sometimes overlooks other important actors, such as career offices.

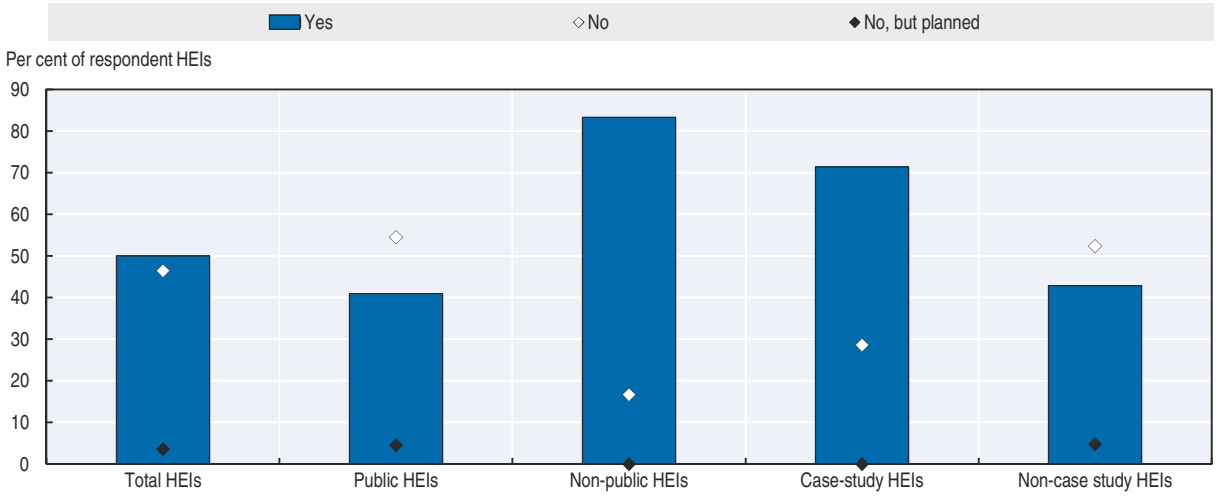
Moreover, it is also crucial to mobilise students, who are often quite active in activities outside of their courses, including research, entrepreneurship and community engagement. The SGH Warsaw School of Economics provides a good example of student participation in the HEI's entrepreneurial agenda (Box 3.3).

There are examples of clear HEI goals and objectives related to the entrepreneurial agenda

There is a need to ensure that proper goals are defined for the HEI entrepreneurial agenda, and the corresponding resources, rewards and incentives. This needs to be achieved at multiple levels ranging all the way from national targets to the individual evaluation that is made of academic staff. A good example of a Polish HEI with clear entrepreneurial strategic goals deployed across the HEI is the GUT Gdansk University of Technology (Box 3.4).

Figure 3.1. **Stakeholder participation in HEI governing bodies**

"Are external stakeholders members of your HEI's governing bodies?"



Note: Total number of respondents was 28, of which 22 were public HEIs, 6 were non-public HEIs; 7 were case study HEIs and 21 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

Box 3.3. **The role of students, SGH Warsaw School of Economics**

Entrepreneurial universities depend, among other factors, upon sound contributions and engagement from entrepreneurial students. As identified by Graham (2014), student-led entrepreneurship and innovation activity has been critical in leading entrepreneurial universities internationally, with "an empowered, cohesive, inventive, bold and well-connected student led entrepreneurial community, benefitting from sustained low-level funding, seasoned entrepreneurial mentors and direct connections to university senior management".

This principle is followed at the SGH Warsaw School of Economics, where there is a considerable number of approaches to creating a "student-centred" environment. This is also reflected in the unique way in which SGH is organised, leading to deep research-based teaching. Its organisational structure includes five colleges, together with the corresponding deans. In addition, bachelor and master's education is supervised by two additional deans. Student representatives, including PhD students, are present not only at the senate level, but also in the colleges.

The community of 13 000 students, including 800 international students from 60 countries, contribute to a variety of initiatives, including: i) Student Research Societies focused on innovation and entrepreneurship related projects; ii) the creation of several start-ups by recent alumni that hire SGH students; iii) support to the Corporate Partners Club, which includes 19 major companies with ties to SGH and its students; iv) regular promotion of events and job fairs; v) creation of new facilities with student participation and company sponsoring (e.g. Proctor&Gamble co-working space, OSTC Trading Lab); vi) fund raising campaigns; vii) master's and doctoral theses conducted in strong collaboration with companies, as well as the participation of BSc students in the solution of practical real world company problems; ix) organisation of social events, such as the SGH charity run; and x) student cultural groups.

Box 3.3. **The role of students, SGH Warsaw School of Economics** *(cont.)*

All these activities are aligned with the SGH mission, which promotes an "educational culture where employers and university work with their students very early and intensively". This has led to a wide variety of positive results. For example, SGH students are highly sought after on the job market and have also achieved international recognition (e.g. as winners of the Google Online Marketing Challenge in 2012 and 2014).

The HEIs' governance models contribute to student participation. In addition to student representatives in the colleges and senate, student involvement is promoted by: i) a student self-governance council, with 27 members, a management board and its president, that receives funding from SGH but is free to make its own decisions; ii) a network of 78 student organisations, including 54 student research societies (some of which carry out activities mostly related to innovation and entrepreneurship) and international student organisations; and iii) a Corporate Centre promotes collaborations with companies and supports "the exchange of ideas and experience between students, alumni, business and scientific experts". Some of the student research societies more directly related to the entrepreneurial agenda, together with some of their flagship initiatives, are the following: i) the Student's Business Club (organising several entrepreneurship promotion events, including Let's Start Up!, with over 2 000 participants, and the High School Business Challenge); ii) Project Management (including PMDAYS, with over 200 participants, and the Solar Boat competition, in collaboration with students from the WUT Warsaw University of Technology); and iii) the Consulting Club (which organises a Marathon of Consulting Companies, with 120 participants, or Casemania).

From a strategic point of view and its practical implementation, students are a major driver in the creation of entrepreneurial environments and activities at SGH.

Box 3.4. **Defining and implementing a strategy, GUT Gdansk University of Technology**

The GUT Gdansk University of Technology makes entrepreneurship quite explicit in its strategy. Seeing itself as an "entrepreneurial university", its mission definition puts education, research and innovation on equal ground. Its mission includes the objectives of "realising innovative undertakings to contribute to society", in particular in science and technology, in line with its motto: "History is Wisdom – Future is Challenge".

The third mission strategy has strong support from the Rector. In addition, GUT has a Vice-Rector in charge of Co-operation and Innovation, something that is quite unusual in the governance models adopted by Polish HEIs. It also relies on the close collaboration of the Deans of the different Faculties, as well as a number of professional and fully dedicated units for innovation and entrepreneurship promotion. Since 2008 it has been managed with a matrix system, where a vertical hierarchical structure is crossed with horizontal processes. External contributions are provided by an Advisory Council that is comprised of 38 members.

This governance model offers a clearly defined, well-structured and systemic approach for the implementation of innovation and entrepreneurship activities. It outlines responsibilities and processes to be carried out (e.g. commissioned research, scientific industrial consortia, direct or indirect commercialisation of R&D results, including incubation, development and divestment stages), and also defines sets of key performance indicators.

Box 3.4. **Defining and implementing a strategy, GUT Gdansk University of Technology** *(cont.)*

GUT's relationships with external companies have involved a number of different initiatives or units, such as: i) the centre for knowledge and entrepreneurship, coupled with EXCENTO, a special-purpose entity for supporting spin-off creation; ii) participation in several "districts of knowledge" in Pomerania and existing clusters, as well as contributions to the regional Research and Innovation Strategy for Smart Specialisation; iii) strong interactions with alumni; iv) 400 co-operation agreements with HEIs from nearly 40 different countries; and v) involvement in innoBaltica, a regional company aimed at promoting research and innovation.

An interactive knowledge portal has also been developed, enabling internal and external stakeholders to search for information on: i) scientific workers and their competencies; ii) scientific publications; iii) research projects; iv) laboratory infrastructures; v) patents; and vi) innovation projects.

Some of the corresponding activities and outcomes include the following: i) 300 inventions ready for implementation, annual revenues from patent licensing of the order of EUR 500 000, about new 20 agreements closed every year, and around 55 new patent applications filed; ii) 700 agreements established with entrepreneurs over the past three years; iii) several collaboration projects with Polish and international companies (e.g. Intel, Samsung, IBM, GE, Schlumberger, Airbus), for a yearly volume of contract research placed at approximately EUR 4 million coming from 300 projects, and 25 R&D consortia including companies; and iv) creation of over five science based spin-off companies since 2013.

Through these efforts, together with its laboratory facilities and human capital, GUT is making a positive contribution to the emerging concepts of "Innovation Valley" in Gdansk and the "Baltic Hub of Knowledge and Entrepreneurship" (innoBaltica).

3.3. Conclusions and recommendations

Reinforce co-ordination mechanisms and multi-level governance

The newly created Innovations Council has a broad mandate and potential to play a significant role in supporting the Polish higher education system in becoming more entrepreneurial and innovative. To promote this agenda, the Innovation Council could take the following steps: i) define and adjust the national strategy, goals and ambitions regarding innovation and entrepreneurship in Polish HEIs; ii) develop and discuss an annual report on progress made and performances achieved; iii) map existing initiatives, adjust them and create new initiatives, with identification of corresponding allocations of resources; iv) clarify the national roadmap for making higher education more entrepreneurial and innovative, providing information on "who is doing what" in this field; v) define incentives, rewards and awards to motivate and promote further participation in entrepreneurial and innovative higher education activities; and vi) ensure that there is a periodic and efficient use of the HEInnovate platform to support self-assessment and improvement of Polish HEIs in these areas. Similar councils could be defined at the regional level (e.g. in articulation with their Research and Innovation Strategies for Smart Specialisation [RIS3]), or at local level, with proper adaptations regarding membership and goals.

An example of how such councils and committees can play a role in building strong innovation and entrepreneurship ecosystems can be found in Hong Kong, which is making rapid advances in start-up support (Box 3.5).

Box 3.5. **An emerging innovation and entrepreneurship ecosystem, Hong Kong**

Description

The Government of Hong Kong is determined to develop Hong Kong into an innovation hub for technology. This effort is being led by a Secretary for Innovation and Technology, who supervises the activities of the Innovation and Technology Bureau (ITB). ITB is responsible for policy matters on the development of innovation and technology and information technology, with the aim "to create a vibrant ecosystem for the government, industry, academia and research sector to interact under a favourable environment with excellent software and hardware support for developing and applying innovation and technology". It oversees the operation of the Innovation and Technology Commission and the Office of the Government Chief Information Officer. Public policies with funding and incentives in this area include: i) the innovation and technology fund; and ii) the R&D Cash Rebate Scheme, to promote company investments in research activities.

Some other key actors regarding innovation and entrepreneurship promotion in Hong Kong are the following:

a) Innovation and Technology Commission, launched in 2000, already mentioned above, with five core strategic objectives (provide world-class technology infrastructures for enterprises, research institutions and universities; offer financial support to develop and commercialise R&D results; nurture talent; strengthen collaboration with China Mainland and other economies; foster a culture of innovation). Among many other initiatives, it organises every year the "InnoTech Month", with a variety of events aimed at fostering an innovation culture, namely across students, through competitions such as the Student Science Project, Joint School Science Exhibition or Innovation and Technology Scholarship awards;

b) Five R&D centres, whose mission is to drive and co-ordinate applied R&D, were established in 2006, for strategic areas of development (automotive parts; ICT; logistics and supply chain management; nanotechnology and advanced materials; textiles and clothing);

c) Advisory Committee on Innovation and Technology, under a new format established in 2015 and chaired by the Advisor to the Chief Executive on Innovation and Technology;

d) The Hong Kong Science and Technology Parks Corporation, established in 2001, provides an integrated portfolio of services, including support to start-ups, and the 22-hectare Hong Kong Science Park has several target sectors (electronics, IT, biotechnology, precision engineering and green technology), with access to common equipment and laboratories;

e) The Hong Kong Applied Science and Technology Research Institute, created in 2000, conducts leading applied R&D to be transferred to companies and hosts new graduates from universities in such projects;

f) The Hong Kong Productivity Council promotes productivity excellence across available value chains, in order to enhance regional competitiveness at the international level, through the adoption of innovative solutions.

A clear vision, together with well-defined strategic priorities and actions, and an integrated and aligned network of institutions, under a consistent organisational structure, contribute to the definition and implementation of ambitious innovation and entrepreneurship developments in Hong Kong. Most of them rely on Hong Kong universities becoming even better and more and more entrepreneurial.

Box 3.5. **An emerging innovation and entrepreneurship ecosystem, Hong Kong** *(cont.)*

These efforts are having positive results. For example, the latest COMPASS results (The Global Start-up Ecosystem Ranking 2015) indicate that Hong Kong has become one of the top emergent entrepreneurial ecosystems in the world (Top 25). Over 2 000 technology based start-ups have been created recently. Furthermore, younger generations are becoming less risk-averse.

As for priorities regarding further improvement of start-up creation and development in Hong Kong, the COMPASS report identifies the following issues: i) increase global know-how among entrepreneurs; ii) improve availability of top technical talent; iii) grow the Tech Angel investor community; iv) develop and execute sub-sector strategies; and v) continue to increase entrepreneurial activities.

Relevance to Poland

Hong Kong is not yet one of the top regions in the world in terms of start-up support environments, but is quickly approaching such a status, and therefore may provide inspiration for Poland or some of its regions, to adopt similar ambitions and consolidate existing environments, to support further growth of innovation and entrepreneurship activities and results.

This example may provide helpful insights to the Polish Government and its relevant public agencies, in coming up with potential improvements concerning setting the clear goal of entrepreneurship and innovation activities and consolidating existing networks and structures, including a clarification of the major roles to be played by each actor.

www.itb.gov.hk/en/.

www.compass.co/.

www.gov.hk/en/about/abouthk/factsheets/docs/technology.pdf.

Existing or new Advisory Boards at the level of each HEI could play a similar role to the new Innovations Council at national level. The roles of such Advisory Boards in Polish HEIs have so far been mostly of consultation and providing non-binding opinions. However, at least for some HEIs, revamped Advisory Boards playing the role of a "Council for Innovation and Entrepreneurship" could also have some decision making duties, namely regarding the definition and approval of HEI strategies, plans of activities, or even definitions of targets to be achieved, and reviews of results from ongoing initiatives. This evolution, from a stricter advisory to a more shared decision making role, has been made in several countries, with positive results in terms of further contributions to the entrepreneurial and innovative HEI.

In order to define and implement HEI strategies regarding innovation and entrepreneurship with inputs received from such Boards, it is important that a senior manager (e.g. Rector or Vice-Rector, or Dean or Vice-Dean) is given responsibility for third mission activities. Such a person would be responsible for defining and implementing entrepreneurial activities. Their duties would include: i) defining and adjusting the HEI strategy, goals and ambitions regarding innovation and entrepreneurship, taking into account inputs coming from the national, regional and local levels (i.e. top-down) and from the Council for Innovation and Entrepreneurship, students, alumni, companies, academic and other staff, faculties, institutes or departments (i.e. bottom-up); ii) prepare and discuss an annual report on progress made and performance achieved; iii) map existing initiatives,

adjusting them and creating possible new ones, with corresponding allocations of resources; iv) clarify the HEI roadmap, providing information on "who is doing what" in this field; v) define incentives, rewards and awards to motivate and promote further participation in entrepreneurial HEI related activities; vi) ensure that there is a periodic and efficient use of the HEInnovate platform to support self-assessment and improvement in the entrepreneurial and innovative HEI agenda; and vii) increase horizontal integration and interdisciplinary co-operation across the HEI with regards to teaching and learning, and research activities.

At a more operational level, innovation and entrepreneurship activities can be boosted if they are promoted by and receive support from dedicated professional offices within the HEI, working in close co-operation with external stakeholders. The exact taxonomy of such services can vary, and there is a lot to gain if they collaborate and have co-ordinated efforts, something that can be more easily achieved if they fall under the leadership of a common Vice-Rector for innovation and entrepreneurship. Various combinations and roles for such supporting units were observed in the case study HEIs, but in general covering the following activities: i) career office; ii) technology transfer office; iii) industrial property management office; iv) special purpose vehicle company owned by HEI that promotes the creation of spinoff companies; v) science based incubator; vi) other incubation or co-working facilities; and vii) connections with Science Parks, business accelerators and investors.

It is also important to ensure that all relevant members of the HEI community have an active role and contribute actively to the HEI's innovation and entrepreneurship activities. This may be achieved both by further involvement of such players in the governance models chosen, and by establishing appropriate communication channels to collect their opinions and suggestions on a regular basis. These relationships can benefit a lot from organisational structures that encourage interactions with: i) alumni; ii) students and student research societies; iii) PhD students; and iv) young professors and researchers. Those perspectives are generally found to be particularly helpful for strengthening the entrepreneurship and innovation agendas within the HEI community, but are not part of the usual HEI organisational and governance models.

Increase international participation and benchmarking

Relative to other countries, the Polish higher education system has a low level of international participation in terms of leadership, governance and benchmarking in the areas of innovation and entrepreneurship. There are several ways in which international perspectives can be deepened in the Polish higher education system. One possibility is to adopt International Advisory Boards within each HEI. These Boards would include a number of international members, as well as possibly Polish nationals who have been developing their careers abroad (in HEIs, leading companies or other organisations).

Given that more structured approaches to innovation and entrepreneurship management in the Polish higher education system are still somewhat young, it may be particularly helpful for people playing leading positions either at the top level (e.g. Rectors, Deans) or technical level (e.g. Technology Transfer, Career, Industrial Property Offices Directors), to have the chance of further learning opportunities, provided also through international collaborations.

One option that has obtained good results in other countries involves short training courses with the participation of international experts that are designed to be attended only by higher education and HEI leaders. Such courses could cover issues and best practices in

the definition and implementation of the entrepreneurial and innovative HEI, including case studies from Poland and abroad. Other Polish initiatives that have had considerable success in the past and deserve consideration for continued use in the future are the Top 500 Innovators Programme and the Young Design Management Programme, which involved exchanges of key staff members and professors from HEIs, including international exchanges.

The potential could also be explored of having international experts and professors staying, as visiting fellows, at a given HEI for a certain period of time, focusing on innovation and entrepreneurship related activities, and bringing in their own experiences and knowledge to be shared in the context of the Polish higher education. A well-defined but small number of positions (including for instance specific Chairs dedicated to innovation and entrepreneurship) might be created, under attractive terms, in order for some international academic or other staff with relevant experience of HEI entrepreneurial and innovative activities, to remain in Poland. Their role would be to lead activities in this area during their stay, as well as to provide coaching, benchmarking and training to some key people in the definition and implementation of the Polish entrepreneurial and innovative HEI agenda.

From another perspective, learning opportunities can be created or strengthened at the national level but also in close collaboration with similar international experiences regarding the following communities of practice and learning: i) Vice-Rectors in charge of innovation and entrepreneurship; ii) technology transfer offices; iii) career offices; iv) patent offices; v) special purpose vehicle companies to support the creation of spinoffs; vi) entrepreneurship teaching and teachers; vii) science based incubators; viii) science parks; and ix) start-up accelerators. In a more formal way, regular meetings for exchanging knowledge and testimonies in these areas can take place, as well as the construction of IT-based platforms for promoting further interactions, sharing of practical case studies and knowledge. International experiences and knowledge can be brought in from similar initiatives in other countries or existing international networks in related areas (e.g. HEInnovate, CONEEECT, ASTPPROTON).

Develop more integrated entrepreneurship strategies and define targets

In order to support a strategy for moving towards more entrepreneurial and innovative HEIs in Poland, it will be useful to set targets for all the actors in the system, together with links that try to assure overall consistency and alignment.

Where possible, a common set of targets and indicators for the entrepreneurial and innovative HEI may be considered that can be applied by all HEIs. Such a set of metrics and indicators should be discussed between the Ministry of Science and Higher Education, HEIs, and the Innovation Council. The common indicators may be a more limited set of criteria than those used by some HEIs, but should provide wide coverage of the core innovation and entrepreneurship activities to be carried out across the system and their expected outcomes.

Some potential metrics could include the following: i) percentage of students that receive a coverage of core innovation and entrepreneurship concepts of at least three ECTS; ii) perceived "fear of failure" in the Polish population; iii) amounts of contract research, development and innovation activities with companies and other external non-academic organisations carried out by HEIs; iv) number of joint publications with authors from HEIs and companies or other organisations; v) HEI revenues from patent licensing agreements; vi) number of spin-off companies created; vii) number of gazelle companies created;

viii) number of companies and other external organisations having regular collaborations with HEIs; ix) number of students that as alumni are working in the local or regional economy of the HEI; x) average wages of alumni; xi) number of jobs created at the local or regional level by companies and organisations related to the HEI, its staff or alumni; and xii) number of HEIs that are conducting HEInnovate self-assessments and improvements.

Collection of such a set of indicators should help ensure that strategies are properly defined, deployed and implemented, at different scales (national, regional, local, HEI, HEI faculties/institutes, or even Departments), and that the loop gets closed, with information and reporting being collected, so that periodic reviews can be made. An integrated periodic overall analysis could be conducted by the new Innovation Council or under the leadership of the Ministry of Science and Higher Education.

Within each HEI, leadership and governance model choices can be made in order to ensure that the agenda for the entrepreneurial and innovative HEI covers the whole spectrum of Faculties/Institutes/Departments, as two recent examples from MIT illustrate (Box 3.6).

Box 3.6. **New University-Wide Initiatives at MIT, USA**

Description

Massachusetts Institute of Technology (MIT) is a well-known HEI, located in Cambridge, USA. It is particularly recognised for its achievements in the areas of innovation and entrepreneurship. Every five years, it assesses its impacts in these areas, the latest report having been released in December 2015. Some of the main results conveyed in this report show, amongst other outcomes, that: i) 25% of its alumni founded companies; ii) 31% of its alumni hold patents; iii) 55% of its alumni lead intrapreneurship and new product development projects; and iv) through its academic staff, students and alumni, over 30 000 active companies were created, employing approximately 4.6 million people and generating annual revenues of nearly USD 2 trillion (approximately EUR 1.8 trillion).

As an entrepreneurial and innovative HEI, MIT continually revisits its approaches to come up with improved solutions for becoming even more entrepreneurial. A major new programme called MIT Innovation Initiative (MITii) was launched at the end of 2013 as the result of a challenge originally placed by the MIT President who asked a 19-member Advisory Committee, including academic staff from all of its Schools, to define what should be done in this regard. In response, the Committee produced a report, "The MIT Innovation Initiative: Sustaining and Extending a Legacy of Innovation", which defined the scope, activities and structure for the MITii, as it stands to this day.

MITii works with all five MIT Schools. It is led by two co-directors, one from the School of Management and the other from the School of Engineering (both being also Associate Deans for Innovation). They report to the Provost, a key position with close connections to all Deans. They also have strong support from the MIT President, who mentored the programme since its inception. MITii also receives contributions from a Faculty Advisory Committee (comprised of 19 academic staff coming from all Schools) and the Provost's Innovation Leadership Group (made of nine well-known senior Professors, also from several Schools). This governance structure provides transversal involvement of all the MIT units into the project, defined as being "an Institute-wide agenda to educate the next generation of global innovators, preparing them to move ideas to impact more effectively throughout their lives by combining hands-on innovation practice opportunities for building expertise in the innovation process with insights developed from the evidence-based innovation science".

The corresponding MITii activities are organised according to the following pillars: i) innovation practice programmes; ii) innovation science and policy; iii) innovation communities; and iv) innovation infrastructure.

Box 3.6. **New University-Wide Initiatives at MIT, USA** *(cont.)*

Some of the ongoing projects, that help to accomplish the MITii goals include: i) a laboratory for innovation science and policy, with people from all the Schools; ii) a wide variety of teaching offers in the areas of innovation and entrepreneurship; iii) translational fellows and impact programmes for postdocs; iv) an innovation diplomats programme for students; v) StartMIT, designed to inspire students of engineering to become entrepreneurs; vi) Catalyst, aimed to accelerate the impact of translational research; and viii) a number of programmes related to manufacturing, including the Advanced Functional Fabrics of America consortium, Manufacturing Innovation Institutes as new public-private partnerships, Advanced Manufacturing Partnership, Production in the Innovation Economy, Education and Workforce Training with Industry Partners, Manufacturing Technology Roadmaps and Strategies.

Under a similar type of arrangement, the Martin Trust Center for MIT Entrepreneurship provides "the expertise, support and connections MIT students need to become effective entrepreneurs". It also serves the overall MIT community, across all Schools and disciplines, together with initiatives for high school students and entrepreneurship teachers. Its main activities correspond to five major axes of intervention: i) entrepreneurship courses; ii) professional advice and mentoring support; iii) a variety of competitions, prizes and entrepreneurship clubs; iv) ongoing promotion of relevant events; and v) global founders' skills accelerator. Overall, there is offer each term, which corresponds to nearly 30 formal and for-credit courses on entrepreneurship, besides online learning opportunities, including "MIT Launch X", conceived for secondary education students. These entrepreneurship courses cover: i) foundation subjects; ii) skill set electives; iii) industry focus electives; and iv) other electives. As for additional novelties, available to undergraduate MIT students from all backgrounds, a new class of "Venture Engineering" (jointly taught by two professors from the Engineering School and two others from the Sloan School of Management) was offered in the Spring of 2016 for the first time, and a minor in Innovation and Entrepreneurship is about to become available.

Founded in 1990, the Martin Trust Centre for MIT Entrepreneurship also provides in its facilities collaborative workspace, meeting rooms with IdeaPaint walls and mentoring support. It also offers intensive short programmes, of around one week duration. These activities are part of a global environment where, in a matrix way, several MIT units (e.g. Venture Mentoring Service, Martin Trust Center for Entrepreneurship, Legatum Center for Development and Entrepreneurship, Desphande Center for Technological Innovation, Technology Licensing Office, Media Lab Entrepreneurship Programme and Lemelson) cover different stages of the evolution and development of entrepreneurial projects (e.g. invention, business idea, validation, commercialisation, business plan, company formation, early stage, scaling and high growth), so that a full spectrum of support mechanisms is made available, without major redundancies.

Relevance to Poland

This example can inspire Polish HEIs to further promote entrepreneurial activities and define governance models where all the different faculties/institutes get deeply involved in the definition and implementation of the entrepreneurial agendas. These choices can help in removing possible barriers or walls between parts of the HEI, so that more integrated initiatives can be designed and implemented, with appropriate contributions and participations from all of the HEI community, regardless of any particular School, Department or Course specificities.

http://entrepreneurship.mit.edu/.

https://innovation.mit.edu/.

www.mit.edu.

Proper resources, incentives and activities should also be put in place for technology commercialisation. This requires recognition of the number of steps and length of time involved in technology innovation processes (Saraiva, 2016), which range from research-related activities (e.g. ideation and ignition of science-based spin-offs) to activities that are

closer to market or social applications (e.g. acceleration of already existing start-ups into international markets). The following sequence of maturity stages in technology development may each need to be supported in certain ways: i) basic principles observed; ii) technology concept formulated; iii) experimental proof of concept; iv) technology validated in lab; v) technology validated in relevant environment; vi) technology demonstrated in relevant environment; vii) system prototype demonstration in operational environment; viii) system complete and qualified; and ix) actual system proven in operational environment. No missing links should occur in this transformation process and appropriate responses, resources, decisions and incentives should be available, so that HEIs can move in the best possible way to next stage of development.

Strengthen incentives, awards and rewards

Proper incentive mechanisms are essential to support HEIs in their entrepreneurial agenda, and are strongly dependent upon the leadership and governance choices made. Strengthening incentives is one of the most powerful ways for getting on board not just a few academic staff who are strong supporters of entrepreneurial HEI activities, but a broader range of professors and researchers, as well as other members of the HEI community under a systemic and well-defined process. Expectations must nonetheless be set under realistic assumptions, since only a small percentage of academic staff are likely to get strongly involved in those activities, even in the most entrepreneurial HEI.

The criteria used for hiring, promoting or performance appraisals of academic staff is an area of concern for academic staff in Poland, but also in almost any other country. Typically these decisions end up being dominated by scientific related activities and results, with strong emphasis placed on the number of papers published and related bibliometric indicators (e.g. h-factor). Both at the national and the HEI levels, ways should be found to reinforce the role played by innovation and entrepreneurship related activities.

There is a range of possible mechanisms that can be used for providing incentives for entrepreneurship and innovation related activities, including: i) grants; ii) awards; iii) credits; iv) workload reductions in other areas for people conducting entrepreneurial activities; v) performance appraisals; vi) financial rewards; vii) tax reductions; viii) hiring and promotions; ix) recognition from leaders; and x) public and press recognitions.

It is up to HEI leaders to establish proper incentives, rewards, awards, recognitions and appraisals, in a way that should be consistent with the overall strategy, targets and expected results. Rather than just speaking about the importance of "third mission" activities, these positive reinforcements are critical for people to realise how serious and coherent the objective of the entrepreneurial and innovative HEI is in Poland.

Incentives may also be developed for companies and external organisations, that may push HEIs into the entrepreneurial track, including: i) tax incentives for R&D or innovation activities carried out by companies with HEIs; ii) vouchers of public funding to SMEs that conduct projects with HEIs; iii) incentives for the recruitment of people with a PhD degree by SMEs; and iv) grants for PhD work conducted in close collaboration with companies or other types of organisations.

It is important to take into account that incentives may cover a wide variety of situations and scales, including as their beneficiaries, among others, under a multi-level perspective: i) regions; ii) cities; iii) HEIs; iv) faculties and institutes; v) departments and divisions; vi) individuals (students, academic and other staff).

In particular, the formula used for defining the public funding budget given to each HEI could give more weight to activities in the areas of entrepreneurship and innovation. A revision of the current system could be considered, so that good HEI performances on the entrepreneurial and innovative HEI agenda can attract additional funding in order to motivate and drive further achievements.

Such incentives can be complemented by competitions and awards (e.g. business ideas and business plan contests). This could be developed in a national framework and an annual schedule, so that the best applications would be first recognised at the HEI level, then at the regional level, and finally at the national level, ending up with an annual event (e.g. HEInnovate Gala), where the best projects in each of a set of selected themes would be recognised, thus generating wide public and press coverage.

Increase use of learning tools such as HEInnovate

HEInnovate is a guidance platform for the entrepreneurial and innovative HEI that has been used by several hundred HEIs for self-assessment, inspiration and learning purposes. Its application is still quite limited in Poland, but national and HEI leaderships may play an important role in encouraging a large number of Polish HEIs to make use of the knowledge available through this platform, as well as having the assessment tool regularly applied by many Polish HEIs as an input to developing regular participative action plans for reinforcing their ambitions, activities and performances as entrepreneurial and innovative HEIs. It is important for Polish HEIs to explore and make proper use of the HEInnovate platform as an important source of knowledge and a tool that can help them in the definition and implementation of entrepreneurial strategies and initiatives. At the same time that they may also share their own experiences with the HEInnovate national and international communities, by participating in HEInnovate events or offering their own materials for this platform.

Such a periodic usage of HEInnovate, with well-defined procedures for analysis and review of approaches and results, could build on and consolidate a wide range of initiatives in HEIs in Poland. The University of Twente in the Netherlands offers a model of how HEInnovate can be used to support the development of an entrepreneurial HEI (Box 3.7).

Box 3.7. **Strong Leadership, Clear Priorities and Results, University of Twente, Netherlands**

Description

A structured approach to becoming an entrepreneurial HEI began at the University of Twente (UT) several decades ago, including the creation of a technology transfer office in 1979, and the deliberate choice of a broader entrepreneurial agenda since the 1980s, including teaching activities, the self-imposed obligation to pursuit research relevant for society, and continuous co-operation with external entities, namely companies, the local economy and its surrounding community. UT was a founding member of the European Consortium of Innovative Universities. Leadership played a key role in defining and deploying such a strategy at the UT.

The UT strategy adopted governance models that integrate this entrepreneurial agenda across all levels and units of the university. "Rendering research useful for society" is an explicit UT top strategic goal and a corresponding core value of UT as an entrepreneurial university. Entrepreneurship promotion is also included in all of the university's strategy documents, which make it clear that "this entrepreneurial spirit is an integral part of UT".

Box 3.7. **Strong Leadership, Clear Priorities and Results, University of Twente, Netherlands** *(cont.)*

These choices were made at the highest leadership level, i.e. by the UT Executive Board, and supported by the UT Supervisory Board. One of the three members of the Executive Board is in charge of entrepreneurship and innovation activities. UT Presidents have also often played a major role in supporting the entrepreneurial university agenda, since many held senior management positions in private companies prior to becoming the President of the UT. Within UT, in addition to involvement of top management and Faculties involvement, each of the research institutes has a business director and business development teams. Furthermore, an innovation co-ordination unit was created at the level of UT management, including the Executive Board Member in charge of innovation, the head of entrepreneurship research and education, the technology transfer director, the Chief Executive Officer of Kennispark and research institutes business directors, meeting on a monthly basis.

As a structure to guide this agenda, Kennispark was established as an umbrella entity, comprising UT, but also the Saxion University of Applied Sciences and local and regional government authorities, in order to promote: i) entrepreneurship; ii) innovation; and iii) an appropriate local ecosystem for innovation and entrepreneurship. Collaborations with other universities in the Netherlands have also been promoted, including joint affiliations of professors in the area of entrepreneurship.

All these activities have also resulted in a number of external recognitions for the UT, including awards for: i) the most entrepreneurial scientist in Netherlands; ii) the science park; and iii) national finalists of the European Entrepreneurship Programme.

With strong top management support, an ambitious strategy and sound governance and organisational structure models, UT is a good example of how universities can be made entrepreneurial, with results that do pay off, particularly when: i) research is asked to become more relevant to society through strong links with companies, the local economy and community; ii) a clear strategy is developed and is translated into goals, plans, activities and appropriate organisational structures across the overall institution; iii) co-ordination, integration and consistency are created at all levels, both within UT and between UT and external partners or other actors; and iv) strong leadership, at all levels, paves the way in the entrepreneurial journey.

Relevance to Poland

This example shows how persistence and determined strategic choices produce results when a university decides to be strong in the entrepreneurship and innovation areas.

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Chapter 4

Building entrepreneurial capacity in Poland through teaching and learning

This chapter assesses the teaching of entrepreneurship in Polish higher education institutions (HEIs). It covers teaching across all faculties using formal and informal methods. Good practice methods and key challenges are identified. The analysis draws on case studies of seven universities in Warsaw, Gdansk, Elblag and Lublin, a student survey in these universities and a broader survey of all HEI leaders in Poland. The chapter also recommends actions for policy makers and universities to strengthen entrepreneurship education.

4.1. Introduction

The higher education system can play a key role in the creation and dissemination of an entrepreneurial culture in society. Entrepreneurship education helps develop the entrepreneurial spirit and initiatives that students need to detect, evaluate and capture attractive value-creation opportunities. This entrepreneurial spirit and initiative is increasingly sought by employers, including large companies, non-governmental organisations, and governments, and are critical for graduates who are considering creating new ventures themselves.

Higher education systems are increasingly developing entrepreneurship education programmes internationally. In the United States, only 15 universities in 1970 – including Harvard – offered courses or programmes dedicated to entrepreneurship. The vast majority of current entrepreneurship education offers began in the 1990s. In Europe, the movement mainly started at the turn of the century but is becoming more common. Today, higher education institutions (HEIs) try to teach entrepreneurship not only through dedicated courses, but also within traditional classes.

Entrepreneurship in education can certainly not be reduced to new venture creation, as it has sometimes been suggested. According to Kuratko (2005), "an entrepreneurial perspective" can and probably must be developed among students. While this may result in more students creating their own businesses, it may also change the attitudes and behaviours of others. This mindset can be useful within or outside businesses or other organisations, private or public, profit-oriented or socially-oriented.

Entrepreneurship requires adapted teaching methods that may be inter-disciplinary and interactive. However, HEIs are often locked into their disciplinary structures, entrepreneurship classes are often school-specific and only offered to students from one or sometimes two disciplines. Apart from business schools, engineering schools increasingly often offer entrepreneurship courses. However, truly interdisciplinary entrepreneurship education programmes have only emerged in a few universities within the European Union.

The increasing number of entrepreneurial education courses and programmes since the turn of the century has resulted in teachers and researchers reflecting on the most effective educational methods to teach entrepreneurship. However, no single dominant approach has emerged. Teaching methods have to be adapted to the specific objectives followed by each programme or course (Gibb, 1993). Fayolle (1999) classifies programmes and courses into three categories corresponding to distinct types of objectives.

The first category relates to *awareness raising* programmes. This category of courses targets the students' community at large and aims at increasing their entrepreneurial spirit and culture, as well as at exposing them to entrepreneurial experiences and opportunities. They are often at the undergraduate level.

The second category relates to *training* programmes or courses and targets students who aspire to launch some kind of entrepreneurial activities, but generally have not yet identified

a specific activity. Such programmes or courses aim to provide students with specific tools to allow them to develop entrepreneurial attitudes and aptitudes, and to be prepared to start or buy a new business or to develop new activities within existing businesses in the near distant future.

The last category relates to *support* programmes or courses and targets students who have already identified a potential business opportunity and who are looking for personalised support and advice to help them to capture that specific opportunity and build their project.

To each of these categories corresponds an adapted educational approach. *Awareness raising* courses draw students' attention to the economic importance of entrepreneurship and of its potential as an occupational choice. Such courses typically require the students to learn the models and theories that have been developed in that field, with a certain degree of conceptualisation, which is a prerequisite for any university-based approach (Fiet, 2001). Besides learning concepts related to entrepreneurship, small business management and intrapreneurship, such courses can help students to discover what launching a business means, and whether it could be a potential career option for them.

Entrepreneurial training programmes go beyond traditional knowledge "transmission-reception" teaching approaches. Active involvement of students and problem-based approaches are important features of such programmes, which aim to achieve the right combination of theoretical concepts and practical business problems. The courses may involve real-life problem solving, direct interactions with entrepreneurs, or business games. Such educational tools allow students to learn, exchange, debate and negotiate around business challenges, as well as to make decisions and to take initiatives in high-uncertainty and fast-moving environments. Such programmes, like any learner-centred programme, tend to require more important teaching resources and supervision and are better suited for smaller groups of students than traditional academic programmes.

The third category of programmes, *support* programmes or courses, typically require a more individualised approach, fine-tuned for the specific characteristics of the business opportunity identified by each student or team and involving a significant amount of coaching, networking and data gathering. This type of learning experience can, for example, be achieved through a student's final thesis or a business plan competition.

While these three categories involve different objectives and means, in all three cases students are confronted with issues related to disciplines ranging from economics, management and law to psychology, sociology and, often, technology. The corresponding educational approaches, while different in nature and scope in the three categories, must therefore all involve a strong interdisciplinary dimension. They must do so not only in addressing in parallel each of those fields, but also in combining them transversally, in the same way as the different aspects of a business must be managed simultaneously by real-life entrepreneurs.

Business schools are no longer the sole provider of entrepreneurship education. Enterprise and entrepreneurship education is increasingly provided within other disciplines. There are several different models that have been used by HEIs to generalise entrepreneurship education throughout the institution (Carey and Matlay, 2011):

- a central entrepreneurship centre;
- an ambassador approach where individuals are identified within each faculty and champion entrepreneurship within them;

- a business school-led approach which delivers entrepreneurship courses in the different faculties;
- *ad hoc* courses delivered without an entrepreneurship centre or links to a business school or other faculties; and
- entrepreneurship education can also be provided within the curricula or outside of it.

Finally, this also raises the question of the appropriate assessment method for entrepreneurship courses (Carey and Matlay, 2011). Traditional examinations do not work very well for entrepreneurship courses. There is no dominant approach to alternative assessment methods. However, it is increasingly common for students to be required to pitch their ideas. Since students are dealing with real-world situations, practitioners sometimes take part in such evaluations.

4.2. Analysis and findings

Entrepreneurship learning outcomes are broadly defined across the higher education system

In 2011, Poland introduced the National Qualifications Framework for Higher Education (NQF for HE), which provides HEIs with autonomy to develop their programmes' content. The NQF for HE contains a broad set of generic, discipline-specific learning outcomes (knowledge, skills and social competence). It is composed of eight different disciplines. In most of these, there are two explicitly entrepreneurship-related learning outcomes:

- "ability to think and act entrepreneurially"; and
- "knowledge of general rules for establishing and developing individual entrepreneurial activities using subject-specific knowledge related to the study programme".

However, there is no legal obligation for HEIs to include these intended learning outcomes in the curricula. The detailed intended learning outcomes, pedagogy, and assessment methods are up to the HEIs to develop. Therefore, each HEI can develop its own approach to developing entrepreneurial skills and mindsets.

The HEI Leader Survey indicates that more than half of responding HEIs offer entrepreneurship education at the bachelor level, 42% at the master's level and 13% at the PhD level. The HEIs estimate that nearly 45% of students are reached by entrepreneurship education, which is very high relative to other European Union countries. However, this estimate may overstate the reach since responding HEIs appear to be more likely than others to offer entrepreneurship education.

But entrepreneurship education offers are highly variable across HEIs

The understanding of entrepreneurship education and how it will be implemented is different from one university to the other, and even from one faculty to the other. In the case study HEIs, most, especially outside of business schools, viewed entrepreneurship as management (generally), or small business management. Students met could not distinguish between entrepreneurship and management. In some HEIs, the understanding of entrepreneurship was limited to technological entrepreneurship. This technology bias *de facto* excludes a wide range of entrepreneurial opportunities in other potential domains of creation – for example in the retail or service sectors – that could otherwise have been pursued. In other HEIs, entrepreneurship was even sometimes confused with economics.

In some HEIs, all faculties offer entrepreneurship courses. However, the content can be very different from one faculty to the other. In some cases it focusses on general management and project management. It is often taught by faculty coming from schools of management or by someone from the business world.

One of the most comprehensive offers is at KU Kozminski University. It offers bachelor students in Management a Major in Entrepreneurship. Many courses compulsory for BA Entrepreneurship Major students are also offered as electives for other bachelor students, as well as MSc students. At the MSc level, there are also specialised entrepreneurship courses, as well as one general course dealing with macroeconomic aspects of entrepreneurship. At the PhD level there are two entrepreneurship courses, one dealing with methodological issues in entrepreneurship research and a second one involving a PhD as an entrepreneurship project. At the BA level, the courses include Principles of Entrepreneurship, New Venture Creation, Family Business Development, Entrepreneurial Networks or Sociology of Entrepreneurship. At the MSc level, these include Entrepreneurship and New Venture Development, Entrepreneurship and Economic Development, Small Enterprise Consulting, New Venture Financing, International Entrepreneurship, Internet-based Entrepreneurship, Entrepreneurial Marketing or Creativity and Innovativeness.

At the WUT Warsaw University of Technology, there is at least one entrepreneurship course offered within most departments at all levels (BA, MSc, PhD). These courses are either about innovation (BA) or technology entrepreneurship (MSc, PhD).

The SGH Warsaw School of Economics offers general entrepreneurship courses at the BA, MSc and postgraduate levels. At the postgraduate levels, they offer specialisations in starting a business and in innovation.

At the UG University of Gdansk, there is currently no programme dedicated to entrepreneurship.

At the GUT Gdansk University of Technology, all faculties offer management/entrepreneurship electives and students can take five credits (one course) in topics like fundamentals of management, business planning, negotiations, business psychology. Again, this shows that the understanding of entrepreneurship can be quite broad and that some courses are rather linked to general management.

At PWSZ The State University of Applied Sciences in Elblag, management education is embedded in the programmes of all departments.

On the other hand, PhD students in Poland sometimes complain about a lack of entrepreneurship education within PhD programmes. In the past, there has been only one example of an entrepreneurial training programme specifically designed for young professors and PhD students, but this initiative has ended (Box 4.1).

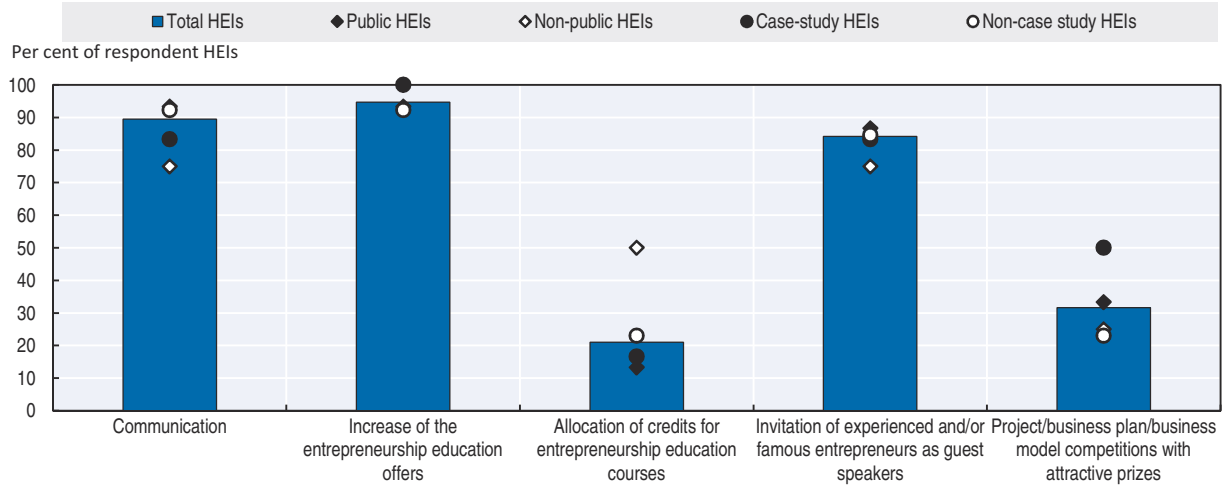
The HEI Leader Survey indicates that most HEIs have taken measures to increase participation in entrepreneurship activities, through increased communication about entrepreneurship programmes and courses, more course offers, and more guest speakers (Figure 4.1) (although the survey also reveals that guest lecturers rarely intervene for more than 25% of the teaching share). Overall few HEIs (21%) indicated that they will allocate more credits to entrepreneurship courses to entice students. However, there is a stark contrast in willingness to provide credits between public HEIs and non-public HEIs, where 50% indicated that they will allocate credits to increase student participation.

Box 4.1. **Innovator course, KU Kozminski University (2007-09)**

INNOVATOR was a high technology-focused entrepreneurship course for young university teachers and PhD students in natural sciences. The project was sponsored by the Polish National Science Foundation. 50 young scientists received training and professional advice. The best projects received further financial support from the National Science Foundation. Several leading spin-off companies emerged from INNOVATOR, one currently being quoted on the Warsaw Stock Exchange. Another interesting outcome of the INNOVATOR programme was the social high-tech project named Bank Mleka, a non-profit organisation offering technologically advanced storage and distribution of natural human breast milk for babies. The INNOVATOR programme stressed some systemic weaknesses in education for potential academic high-tech entrepreneurs. The participants, on average approximately 30 years old, were exposed to entrepreneurial thinking for the first time. The impact, i.e. the number and quality of high-tech start-ups, could potentially have been much higher if INNOVATOR participants had received basic entrepreneurship training at the bachelor or master level.

Figure 4.1. **Increasing participation in entrepreneurship education activities**

"What measures does your HEI implement to increase participation rates in entrepreneurship education activities?"



Note: Total number of respondents was 19, of which 15 were public HEIs, 4 were non-public HEIs; 6 were case study HEIs and 13 were not case study HEIs.

Source: OECD (2016), *OECD HEI Leader Survey Poland*.

Other good practices include original entrepreneurship courses that reflect some specific features of the local economic environment, which had been developed at several of the case study HEIs (Box 4.2). Furthermore, intellectual property (IP) is a central theme for most of the HEIs, and is seen as an important topic for future entrepreneurs, particularly including PhD students. UMCS Maria Curie-Sklodowska University, for instance, provides all students with 15 hours of mandatory training on IP protection.

Teaching and evaluation methods remain very traditional

The pedagogical format for most of the entrepreneurship courses offered at the case study HEIs is rather traditional and based on a knowledge transmission-reception pedagogical model. Both the HEI Leader Survey (see Figure 2.6 in Chapter 2) and the case study visits show that traditional lectures and inviting guest-speakers are the dominant

Box 4.2. **Tailoring courses to the students' needs and to the environment**

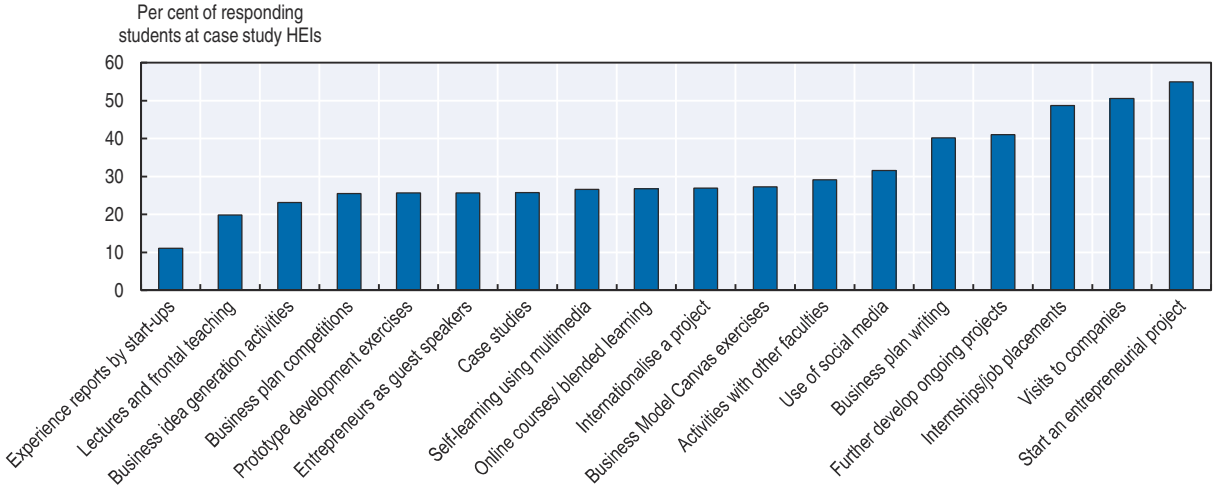
Some of the universities visited offer original or atypical entrepreneurship courses. In Elblag, the State University of Applied Sciences has a special programme in entrepreneurship of security, which prepares their students to open their own bodyguards or detectives business. In the faculty of law at UMCS Maria Curie-Sklodowska University, students are taught how to start and manage a law firm. This is also a good practice showing that these universities/programmes are flexible in their approach to teaching entrepreneurship and tailor their courses to their students' needs and economic context.

teaching methods for entrepreneurship. However, the case study HEIs appear to be increasing their use of more active learning methods, including problem-based learning, business plan writing, firm creation simulation and idea generation as part of their pedagogy.

These active learning methods are popular with students. The students met during the case study visits indicated that they would like more workshops, group work, exposure to business people, and soft skills (e.g. leadership, soft skills). Further, the HEInnovate Student Survey confirms these observations. It also indicates that more than half of student respondents have not have an opportunity to start an entrepreneurial project but would like to (Figure 4.2).

Figure 4.2. **Teaching methods sought by students**

"From the teaching methods you did not come across yet, which are the three you would like to see introduced in your study programme?"



Note: 1 743 students responded to this question.
Source: OECD (2016b), *OECD HEInnovate Student Survey Poland*.

This traditional approach is also apparent in student evaluation methods. Evaluation of students for entrepreneurship courses is still often based on final exams that test theoretical knowledge. This is not the most appropriate approach for entrepreneurial training courses or entrepreneurship support programmes which have the objective of developing entrepreneurial skills and competences. Finding more adapted methods for assessing this

type of programme is a challenge that many HEIs face around the world. Among the case study HEIs in Poland, some are responding by allowing students to prepare a thesis on starting a business (PWSZ University of Applied Science in Elblag, GUT Gdansk University of Technology and WUT Warsaw University of Technology). This is a good practice that relates to the third type of entrepreneurship education programmes, i.e. *support* programmes for students who have already identified a business opportunity and are looking for personalised support to study its feasibility. The assessment of this type of programme could be achieved through a business plan competition, but is likely to be even better implemented through a final thesis, because the latter usually lasts many months, if not a whole year, and involves many interactions with the thesis director.

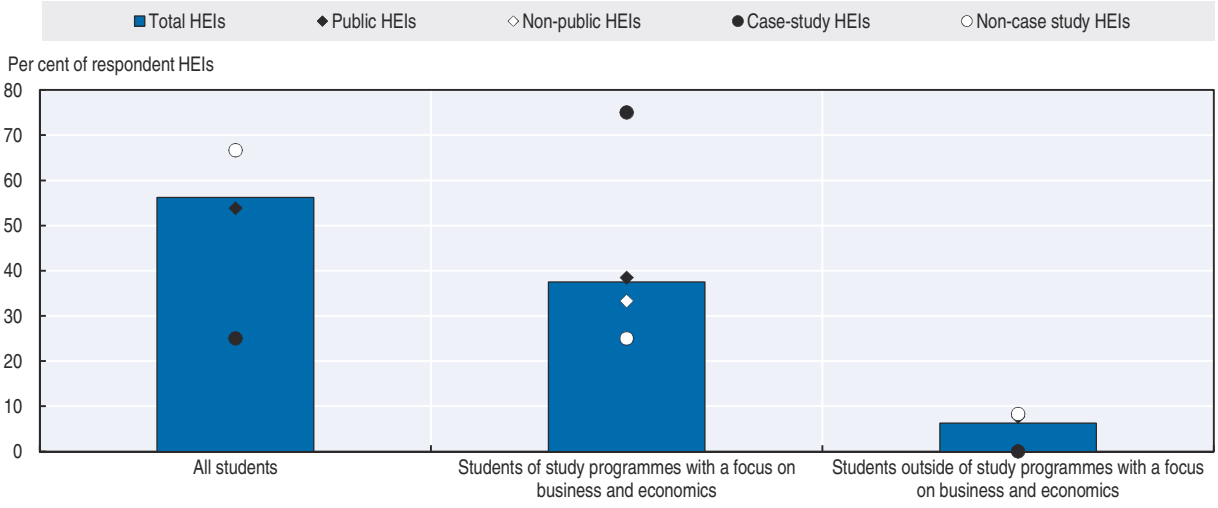
Teaching continues to be faculty-centred

Entrepreneurship is interdisciplinary by nature, but the academic environment in Poland (and elsewhere) is still not very favourable for interdisciplinary projects. For example, it is extremely difficult to get professors to deviate from their disciplinary framework. Assessment and evaluation systems for professors and criteria for promotion tend to favour research over teaching and, in particular, strictly disciplinary research. Rewarding interdisciplinary teaching approaches therefore remains challenging, not only in Poland, but across all higher education systems.

This does not mean that entrepreneurship education is not offered outside of business schools. Nearly two-thirds of HEIs responding to the HEI Leader Survey reported that they offer entrepreneurship curriculum to students outside of business and economics programmes or to students whatever their discipline (Figure 4.3).

Figure 4.3. **Share of HEIs offering entrepreneurship education to students**

"Are entrepreneurship curriculum activities offered to ...?"



Note: Total number of respondents was 16, of which 13 were public HEIs, 3 were non-public HEIs; 4 were case study HEIs and 12 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

However, most Polish HEIs appear to use approaches that are still very faculty-centred and almost never university-wide. Even within technical universities, the walls between engineering schools, for instance, can be quite high. Entrepreneurship courses tend to be

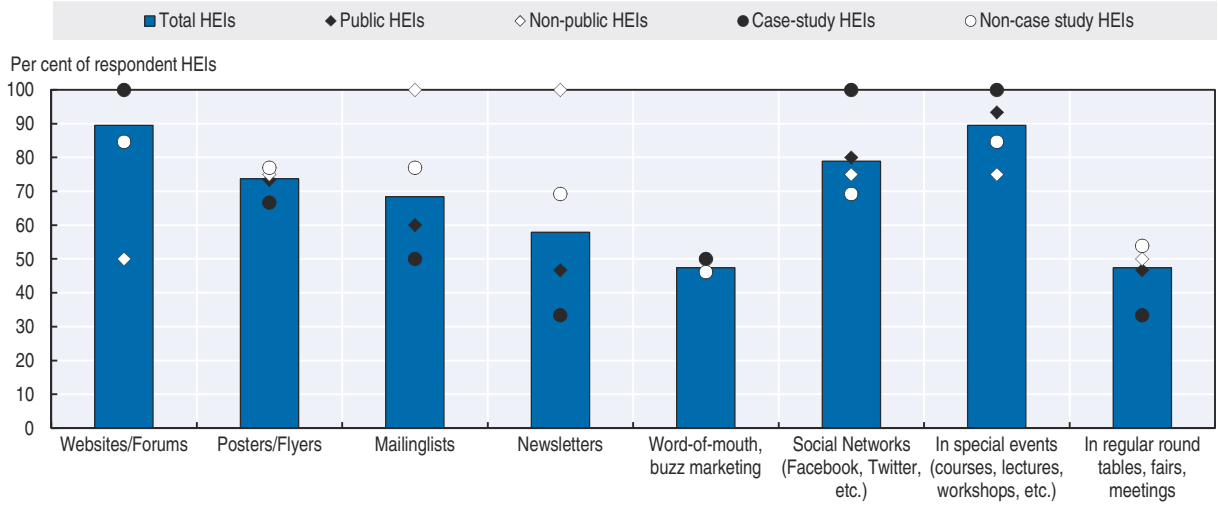
faculty-specific (entrepreneurship for biologists for instance), and often, deans do not seem to be too enthusiastic to change this.

On the other hand, some career offices (including those at GUT Gdansk University, UMCS Maria Curie-Sklodowska University, SGH Warsaw School of Economics, and WUT Warsaw University of Technology) consider promoting entrepreneurship as part of their job. At UMCS Maria Curie-Skoldolwska University, for instance, the career office organises sessions on how to become an entrepreneur and how to set up an NGO. The various career offices also provide workshops on creativity, business planning, etc.

Entrepreneurship education activities appear to be well publicised to students across HEIs, with strong use of websites/forums, special events and social networks in particular (Figure 4.4).

Figure 4.4. **Advertising entrepreneurship education activities**

"How does your HEI advertise the entrepreneurship education activities that are organised outside study curricula/programmes or open across faculties?"



Note: Total number of respondents was 19, of which 15 were public HEIs, 4 were non-public HEIs; 6 were case study HEIs and 13 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

There is a need to build a pool of Professors of Entrepreneurship

There appear to be relatively few professors in Poland with the title "Professor of Entrepreneurship". For example, only around a half of HEIs that responded to the HEI Leader Survey reported that they have professors with this title.

Most entrepreneurship professors are not formally trained in entrepreneurship. Quite often, they are not part of entrepreneurship educators networks, nor do research in entrepreneurship. In part, this is related to the status of entrepreneurship as an academic discipline in Poland. Entrepreneurship does not seem to be viewed as a "real" academic discipline by most Polish professors. Although the field of entrepreneurship is recognised as being of fundamental importance for the economy, and although it is attracting an ever growing interest within the international scientific community, many appear to have troubles identifying it as a distinctive field of research. This undermines its scientific legitimacy, especially in the eyes of scholars outside, and sometimes inside, of business schools. Entrepreneurship seems to be a broad label under which a large variety of activities is housed in Poland.

Some of the case study HEIs have attempted to build legitimacy for entrepreneurship through various activities. One approach is through academic research. At the GUT Gdansk University of Technology, within the Faculty of Economics and Management, legitimacy of the field in the school was strengthened by research by some professors (e.g. on female entrepreneurship and on entrepreneurial intentions), which enabled them to gain internal recognition and then to become more ambitious in terms of programmes.

Alternatively, a number of programmes have aimed to improve the knowledge and skills of professors. This in turn can increase their visibility on campus if the experience is used to improve their teaching and research. One example is the Top 500 Innovators Programme. This programme allowed some young faculty members at the SGH Warsaw School of Economics to obtain formal training in entrepreneurship in the USA, carried out through the National Centre for Research and Development. Similarly, two professors at the WUT Warsaw University of Technology obtained formal training in entrepreneurship at the University of California, Berkeley and at MIT. These trainings helped them to teach current entrepreneurship hot topics, like lean start-up.

A second example is The Young Design Management project, also at the SGH Warsaw School of Economics. Launched in October 2010 and co-financed by the European Social Fund, the project aimed to increase the flexibility of teaching within undergraduate studies in Management (in two majors: Entrepreneurship and Project Management). The project is aimed at improving the qualifications of the academic staff. Actions in the Project included: i) research visits of staff in international academic centres for up to 5.5 months in order to participate as observers in selected research and teaching activities, thus increasing familiarity with modern pedagogical methods (case studies, discussions, simulations, interactive classes), and co-operation with international colleagues; and ii) participation in national and international conferences.

Finally, HEI leaders can be very important in creating an entrepreneurial culture and setting-up entrepreneurship programmes, especially if entrepreneurship is not seen as "academic enough". Two good examples are the University of Applied Sciences in Elblag and KU Kozminski University. In Elblag, the Rector is a central figure in the community and has helped the HEI become entrepreneurially-oriented through his strong connections with the local business community and other key actors in the entrepreneurial ecosystem (e.g. incubators). KU Kozminski University was co-created by an academic and an entrepreneur who set up a centre for entrepreneurship from the beginning. It is much more focused on soft skills than other schools (e.g. public presentations; self-coaching; negotiation; intercultural skills, etc.). The centre for entrepreneurship is also responsible for outreach to the community, provides training for the community, organises large entrepreneurial projects, leads a national training programme for entrepreneurship professors, and writes policy direction papers destined to politicians. The members of the centre do research in entrepreneurship and publish in entrepreneurship journals. They also currently have five PhD students in entrepreneurship.

It is also important for professors to familiarise themselves with entrepreneurship through personal entrepreneurial experience, for example developing spin-off activities. The Polish legal framework does not put any restrictions on the activities that can be undertaken by professors inside or outside academia. These issues are usually subject to the HEI's internal policy. The only legal restriction concerns employment in other HEIs as a member of their "minimum core staff". However, professors' evaluation is mainly based on research. The titles of Full Professor

(*professor zwyczajny*) and *Doktor habilitowany* are mainly, if not exclusively, dependent upon research. Even if faculties have some autonomy in evaluating their staff and if entrepreneurial activities could be rewarded in some ways, opposition often comes from the professors themselves who tend to put disciplinary research at the core of their activities. Professors who have entrepreneurial projects start their firm independently from the university, often do not expect support from the university and have to work on top of their university activities. It is not taken into account for promotion, but nevertheless often it is seen positively by the university.

Students are active in shaping their own entrepreneurial learning

Students tend to turn towards out-of-class experiences to gain practical knowledge of entrepreneurship through student clubs that are supposed to be research-oriented, but, in practice, are often very business and entrepreneurially oriented. The HEInnovate Leader and Student Surveys show that extra-curricular activities have dramatically increased over the five last years. For some future entrepreneurs, this kind of experience replaces formal learning. Student clubs are an important activity for entrepreneurship experience, since students are required to run their own organisations, build relationships with people on and off-campus and seek support from academic staff when needed. This is teaching students to be entrepreneurial by building networks and drawing on the resources that they have.

4.3. Conclusions and recommendations

HEIs and professors need a clearer and broader understanding of entrepreneurship

There are numerous different definitions of entrepreneurship and, of course, this does not help when one needs to define the content of a course. However, most, if not all, definitions have four central concepts:

- the entrepreneur: they can be the creator of a new organisation, the buyer of an existing one or even an employee developing new projects within an organisation;
- the resources that will be used: these are necessarily limited and the entrepreneur must control them without necessarily owning them, to achieve his/her goals;
- value creation: this implies the creation of any form of wealth (e.g. money, independence, power, self-esteem, social impact), not only for a stakeholder of the organisation, but also for the entrepreneur himself or the society as a whole. The concept of value is based on the perception of the entrepreneur and his/her motivations;
- the opportunity: a central concept in entrepreneurship, which the entrepreneur will try to seize according to his/her motivations and expectations.

The scope of entrepreneurship support in Polish HEIs needs to be seen as going beyond new business creation in a restrictive sense to include entrepreneurial skills and activities in their widest sense, such as intrapreneurship, working for an established small business, NGOs, spin-offs, etc. and, more generally, the development of an entrepreneurial mind set. In line with these aims, the impact assessment of entrepreneurship education programmes needs to look beyond the measurement of the number of firms created by graduates.

The nature of entrepreneurship implies that it needs to be clearly differentiated from general management. Entrepreneurship needs to be recognised and understood as a separate academic discipline. This broad view should be initiated by department heads, deans, and other HEI leaders, as well as shared by entrepreneurship professors.

The Ministry of Science and Higher Education should encourage and support HEIs in developing entrepreneurship as an academic/scientific discipline

Raising the profile of entrepreneurship as an academic discipline in HEIs is a challenge in many countries since entrepreneurship is a relatively young field. It is especially a challenge in Poland where few entrepreneurship professors have degrees or formal training in entrepreneurship. Addressing this challenge can be achieved in several ways in parallel.

First, when hiring new entrepreneurship professors, candidates with formal training in entrepreneurship should be favoured. Ideally they should have PhDs in entrepreneurship.

Second, entrepreneurship education and research can be increasingly promoted and supported at the PhD level in Poland. This can be stimulated with research grants, for example.

Third, entrepreneurship professors and other professors who teach entrepreneurship should be offered entrepreneurship education training programmes on the development of teaching content and in delivery methods. Further, there is little training on supporting new business start-up projects. Training for existing academic staff could be provided in two levels – basic and advanced. Basic training would cover what entrepreneurship is and why it is important so that teachers have an understanding of why they are teaching entrepreneurship and how they can be successful. This needs to be complemented with more advanced training on pedagogy. There are several training programmes and networks that could be used to support training in Poland (see Box 4.3).

Box 4.3. **International training networks for entrepreneurship educators**

Description

CONNEECT

CONNEECT is an international network of universities that offers interactive training courses for academic entrepreneurship teachers to improve entrepreneurship education across Europe. Supported by the European Union, participants, and their associated institutions benefit from intense training programmes and easy access to the European entrepreneurship community. In interdisciplinary teams, best-practice entrepreneurship education is delivered by international experts, coaches and trainers. Idea exchange and network building takes place in open forums, closely linked to the global entrepreneurship scene. CONNEECT offers opportunities to learn, experience and design new teaching methods, materials and learning outcome assessment techniques to enhance entrepreneurial teaching impact.

Price Babson Symposium for Entrepreneurship Educators

The Symposia for Entrepreneurship Educators (SEE) have taught educators from institutions around the globe since 1984. They have trained over 3 200 academics and entrepreneurs from 750 academic institutions, government organisations, and foundations in 68 countries. The symposia include the Price-Babson Symposium for Entrepreneurship Educators held twice a year on Babson's campus. The events aim at helping educators understand the importance of combining entrepreneurship theory and practice in teaching.

Relevance for Poland

Participation in international networks and training initiatives can expose Polish academic staff to new perspectives and broaden their understanding of entrepreneurship. These new perspectives can be fed into the courses to provide students with a broader entrepreneurship education. Participation in such networks and events also holds potential for generating new international opportunities in teaching and/or research.

Fourth, research is an important activity in Polish HEIs, yet very little research on entrepreneurship is undertaken. More support for entrepreneurship research is needed to increase interest among professors in entrepreneurship. An easy way to stimulate more entrepreneurship research would be to promote participation in international entrepreneurship conferences and to sponsor some professors to attend (Box 4.4). This could also be accomplished with the creation of an entrepreneurship research fund for Poland, support for participation in international entrepreneurship research projects, the creation of a national prize for entrepreneurship research and encouraging HEIs to create "Professors of Entrepreneurship" to give status to Polish entrepreneurship professors.

Box 4.4. **European scientific network in entrepreneurship**

The main European scientific association in entrepreneurship is the European Council for Small Business and Entrepreneurship (ECSB). The network of ECSB's members covers nearly the whole of Europe and has some 400 members in over 30 countries. Through its affiliation to the International Council for Small Business, the European network is also connected to the global academic and professional small business community. ECSB organises high-quality conferences for its members, such as the RENT conference in co-operation with EIASM, in order to facilitate and enhance the exchange of knowledge within the ECSB community.

HEIs should promote interdisciplinarity and co-operation among schools and professors from different disciplines/faculties

Polish higher education is increasingly becoming more interdisciplinary but there is room to go much further. Within HEIs there needs to be a clear message, if not a decision, coming from the top of the university to push faculties in this direction so that students have opportunities to interact and work with students from other programmes. This helps them develop team work and communication skills. Such programmes are also useful to build new relationships across academic staff, opening up new opportunities for interdisciplinary research. The Université catholique de Louvain in Belgium offers a model for interdisciplinary programmes that can be followed (Box 4.5).

Box 4.5. **Interdisciplinary programmes at the Université catholique de Louvain, Belgium**

Description

Initiated in 1997 by the Rector of the Université catholique de Louvain (UCL) and a major bank CEO, and equipped with substantial support from private companies, the *Formation Interdisciplinaire en création d'entreprise* (CPME) is an interdisciplinary initiative where students from almost all schools (management, law, engineering, physiotherapy, psychology, sciences, agronomy and liberal arts) of the comprehensive UCL are brought together in cross-disciplinary teams to create businesses. Teams consist of students coming from three different disciplines.

The original aim of the CPME programme was to stimulate new business creation. This was later broadened to include entrepreneurial skills and activities in their widest sense, i.e. intrapreneurship, working for SMEs, not-for-profit creation, spin-offs, business buy-outs and developing entrepreneurial mindsets at large. The programme is not a separate master's degree but consists of a set of dedicated elective courses that are integrated into the corresponding

Box 4.5. **Interdisciplinary programmes at the Université catholique de Louvain, Belgium** *(cont.)*

master degrees from the eight different faculties. The CPME programme is managed in close collaboration with the faculty managing the parent degrees. It is spread across the last two years of the parent degree, where the second year master thesis project revolves around creating a new business based on the students' own or an external business idea. Around 30 students are admitted each year, and the classes are taught in the evening in order to fit into the different programmes. The programme has a dedicated building and students have 24-hour access to these facilities, including computers, team rooms and other facilities. This creates a bonding effect among students, promoting knowledge exchange and collaboration across cohorts and disciplinary affiliations.

Approximately 20% to 25% of the students who graduated from the programme have created a firm.

Historical and current challenges are mainly related to the interdisciplinary nature of the programme, such as convincing colleagues in different schools at UCL of the importance of entrepreneurship and adhering to the varying assessment rules of each disciplinary framework. Difficulties in accepting a master thesis in the form of a business plan are an example of an issue related to assessment.

Relevance for Poland

This example illustrates how interdisciplinary entrepreneurship programmes can be designed and implemented by HEIs.

HEIs should integrate entrepreneurial activities and innovative entrepreneurial teaching methods within the evaluation and promotion systems of professors

A barrier in expanding entrepreneurship education is the incentive and reward system for HEIs and for academic staff. The enthusiasm for entrepreneurship observed within relevant Ministries, HEI stakeholders and professors is often shared by HEI management but they are in a difficult position in terms of acting on this enthusiasm because HEI funding is linked to research, which is not consistent with developing and implementing entrepreneurship activities. It is therefore important to set up incentive systems to motivate and reward faculty staff in supporting students interested in entrepreneurship, and acknowledge the academic value of research and activities in the entrepreneurship field. Successful approaches include reduction of teaching or increased workspace (i.e. laboratories).

HEIs should develop packages of entrepreneurship awareness-raising, training and support programmes

HEIs should develop the three different kinds of entrepreneurship education programmes identified above – entrepreneurship awareness-raising programmes, entrepreneurship training programmes, and entrepreneurship support programmes. The main gap is at the level of training programmes, which are still quite scarce in most universities. Awareness-raising programmes also need to be strengthened because, too often, they are still general management courses. Educators for these programmes need to be trained in entrepreneurship education and research, and encouraged to invest in novel pedagogies, like action-based education (Box 4.6), which also means departing from traditional exam-based evaluation methods. HEIs should also generalise the possibility of entrepreneurial theses for their students, i.e. theses about business plans, new venture creation, spin-off creations.

Box 4.6. **Action-based education at Babson College, USA**

Description

Babson College (Boston, USA) is a leading school in entrepreneurial education in the USA. The College's focus on entrepreneurship became an explicit emphasis in 1977. 100% of Babson students take entrepreneurship courses. About 14% of MBA students start businesses at graduation and, after five years, more than 50% are working in entrepreneurial or small firms.

Babson has been a pioneer in starting businesses as part of students' coursework. Babson's "Foundations of Management and Entrepreneurship (FME)" course was started in 1996. First year undergraduate students have to start a business within this required course, which teaches them about opportunity recognition, finding resources, team development, value creation, entrepreneurial thinking and basic understanding of all business functions. The course blends theory and practice. The learning objectives of the course are to: practice entrepreneurship and generate economic and social value; make students understand the different functions of a business and their interactions; use information technology for decisions and learn its importance for all functions; and experience social responsibility and philanthropy by donating six hours minimum as well as their profits to a charity. Babson insists on the importance of placing such a course at the beginning and not at the end of the programme because this will help students to understand entrepreneurs and the firm before they go to more disciplinary areas. This also gives students more confidence by experiencing success and failure. They develop their own leadership style and knowledge about the importance of human resources.

The assumptions behind this method are that:

- This kind of course can be used with novices or experts;
- Entrepreneurship applies to any organisation. Success is not only about profit, but is idiosyncratic and multidimensional;
- The method is first about doing, then learning, rather than the contrary; and
- The environment is unpredictable.

Other Babson courses at the MBA level admit only students with a well-developed business concept, wanting to start their company at the latest immediately after graduation, and having been able to attract a mentor during an audition. Activities include the development of a timeline for launching the business, identification and meetings with customers, working with mentors, interacting with guest speakers, meetings with professors, discussions with other students, and identifying, attending, as well as reporting back. 15-20 volunteers serve each year as mentors and guest speakers. A team of two professors teaches this course. Mentors and guest speakers do not get paid.

Relevance for Poland

This example offers another model of activating students in entrepreneurship, complementing the example from the SGH Warsaw School of Economics (see Box 3.3 in Chapter 3). These models can be used by HEIs in Poland to engage students in an entrepreneurship learning experience.

Source: Neck, H.M. and P. G. Greene (2011), "Entrepreneurship Education: known worlds and new frontiers", *Journal of Small Business Management*, Vol. 49, No. 1, pp. 55-70.

HEIs should continue to increasingly involve external stakeholders in designing and delivering entrepreneurship education

HEIs should work with the university's environment and external stakeholders to develop entrepreneurship education programmes, including regional/local governments, chambers of commerce and financial institutions. In particular, there is a need to increase co-operation with alumni, venture capitalists, business angels and/or small businesses. Their participation in courses should be increased to include role-plays involving real world stakeholders. Real investors and entrepreneurs should be mobilised in classes, among other things, in order to evaluate students' projects. Students should be encouraged to work on real ideas coming from the university labs (and leading to the creation of spin-offs) or from business people. External stakeholders should also be integrated in the bodies running entrepreneurship programmes (e.g. advisory boards). A successful approach is the Business Creation Lab at the University of Tromsø in Norway, which is focussed on supporting students with applied "real world" projects (Box 4.7).

Box 4.7. **Developing entrepreneurial projects with the environment, University of Tromsø, Norway**

Description

The Business Creation and Entrepreneurship (BCE) programme at the University of Tromsø is a group-based master's programme that offers students the tools to become entrepreneurs, innovators, and creative thinkers through an action-based curriculum involving real-life projects. The students' aim is to found a business right after graduation or to become intrapreneurs within existing firms.

The first term is called the Business Creation Lab. The Lab's main objective is to create a foundation for innovative project development in the second year and to teach how to bring knowledge-based ideas to the market. The first semester involves role-play exercises and group work. Students work on an idea from the start. The programme uses real ideas and real investors as part of the role-play. During the second term, students must choose one of three following options: i) they can develop their own idea (they can use the campus and all the faculties' facilities and labs to develop it); ii) they can work on other people's ideas, coming for instance from the idea bank which contains projects related with the scientific environment in the Tromsø region, primarily from the University, but also from the University Hospital and other affiliated research entities; iii) they can collaborate with an established company on creativity and innovation projects. In this last case, students will collaborate with BCE staff and industrial managers to design innovative solutions to real business problems. They will do in-depth field research, brainstorm sessions, prototyping, and eventually test their solutions in a team setting. The students apply the knowledge from their courses in the second and third term on the chosen idea or project. During the last term, they write their master thesis. They also learn presentation techniques, notably through real presentations to external stakeholders.

Relevance for Poland

This example offers a model for engaging students in entrepreneurial projects with other actors in the community. These projects could be short-term (e.g. start-up weekends), course work or thesis projects.

Source: Entrepreneurial Learning Forum, Chalmers University, 2012.

The Ministry of Science and Higher Education should encourage entrepreneurship through leadership training for Rectors, Vice-Rectors and Deans

The role of HEI leaders (e.g. Rectors, Vice-Rectors, Deans) in promoting entrepreneurship is of paramount importance. Their role is decisive in recognising entrepreneurship as an academic discipline, in making entrepreneurship part of an academic's career aims, in promoting interdisciplinarity, in hiring entrepreneurship professors, in stimulating co-operation between faculties, in starting new entrepreneurship programmes, in involving external stakeholders or in changing pedagogical approaches. If needed, they could also sometimes bypass Deans in implementing some of these decisions.

The Ministry of Science and Higher Education should support entrepreneurship professors with networks, training and platforms of good practice exchange

The Polish government also has a role in promoting entrepreneurship in higher education. It could adapt the professors' promotion system in order to better integrate professors' efforts towards starting their own company or towards developing new entrepreneurial pedagogies. The government should also try to put a follow-up to the Top 500 Innovators Programme into place for academic staff; the newly created network for past participants appears to have a low level of awareness so more efforts are needed to promote and animate it. The Academic Network of Entrepreneurship Educators (SEIPA) was also a very good resource for entrepreneurship educators in Poland. It targeted all kinds of schools, especially those not related to business education. Its activities included practical training and advice about launching academic programmes in entrepreneurship for students and academic staff, possibilities to exchange experiences and good practices during seminars and conferences, as well as through a dedicated electronic platform (*www.seipa.edu.pl*). The government could encourage similar networks of entrepreneurship professors, platforms for best practice exchange, methods for teaching the teachers, etc.

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Chapter 5

Preparing and supporting entrepreneurs in Poland's higher education institutions

This chapter assesses support provided by Polish higher education institutions (HEIs) to students and academic staff in business creation. It provides an overview of the main structures that are currently in place to support business start-up by students and academic staff, including academic incubators, business accelerators and technology transfer offices. Based on case studies of seven universities in Warsaw, Gdansk, Elblag and Lublin, including a student survey, as well as a national HEI leaders' survey, the analysis contained in this chapter identifies the strengths of the start-up support system and areas for improvement. Recommendations are made for both the Ministry of Science and Higher Education and the HEIs on how to bolster business start-up support for students and academic staff.

5.1. Introduction

A critical element of being an entrepreneurial university is to offer pathways for potential entrepreneurs (staff and students) to take entrepreneurial ideas to market, and to support them in this process. This is not just a process internal to the university but one where a pluralistic approach is necessary to provide access to internal and external opportunities and expertise. A key success factor in providing quality support for entrepreneurs is partnerships with the business community in the design and delivery of start-up support.

Preparing and supporting entrepreneurs entails targeted actions to assist students in the process of setting up a business. Business start-up education is needed to help students and staff acquire entrepreneurship skills that will help them successfully launch and grow businesses. This can be provided as an entrepreneurship training element within broader entrepreneurship education offers in the HEI curriculum, or through specific extra-curricular entrepreneurship training or other learning opportunities such as business plan competitions, business simulations and opportunities to learn from business experience.

Entrepreneurial universities also provide business start-up and development support for staff and students to convert their entrepreneurial ideas into action. This includes coaching and mentoring, access to university facilities, temporary business premises, support in developing networks and facilitation of access to financing for start-up. Universities can provide this support directly themselves with on-campus offerings, or by referring potential entrepreneurs to specialised start-up support services that are off-campus within the local community.

Higher education institutions (HEIs) generally face several challenges in preparing and supporting entrepreneurs. This includes the internal organisational structure of institutions. Faculties and departments often work separately and there are often obstacles, such as a rigid curriculum structure, that impede inter-disciplinary approaches and prevent students from taking entrepreneurship training courses when they are offered outside of their faculty. Another challenge is the inexperience in providing entrepreneurship training among teaching staff and business support staff. There can also be a problem of incentives to university teachers and researchers for supporting entrepreneurs or starting entrepreneurial ventures themselves, given the importance placed on research and publications in career reward systems. Furthermore, one of the most-often cited challenges of starting and scaling-up entrepreneurship programmes is funding. Many universities have difficulty funding entrepreneurship support initiatives and thus tend to rely on public financing. This however is a temporary solution as public funding may not be a sustainable source of financing.

5.2. Current approaches to preparing and supporting entrepreneurs

Components of the start-up support system

Poland has a comprehensive business start-up infrastructure, consisting of a wide range of institutions such as science and technology parks, technology incubators, academic and

entrepreneurship incubators and technology transfer centres. These institutions are managed and operated by various public and private actors.

However, in recent years, there has been a reduction in the number of business start-up support institutions. In particular, the number of technology parks decreased from 54 in 2012 to 42 in 2014 and similarly the number of technology incubators decreased from 29 to 23 over the same period (PARP, 2014). This reduction is due to funding pressures.

Academic Incubators of Entrepreneurship

The principal structure for supporting students in business creation is the network of Academic Incubators of Entrepreneurship (AIP). This network consists of incubators that are situated within, or occasionally near, HEIs. They provide various services to student entrepreneurs, including training, legal advice, accounting services and premises. These offerings greatly vary from one centre to another. Students can operate their businesses without officially registering them; the businesses operate under the umbrella of AIP. One of the main advantages of this approach is that the businesses are not required to pay social security contributions.

The network of AIP incubators is operated by the Foundation of Academic Incubators of Entrepreneurship (see Box 5.1). It works with HEIs through formal agreements that allow AIPs to be set up on campus and the HEIs provide some promotion and funding. In 2015, there were 56 AIP incubators. Since their creation in 2004, AIP has led to the creation of 12 000 companies.

Box 5.1. **Foundation of Academic Incubators of Entrepreneurship**

The Foundation of Academic Incubators of Entrepreneurship operates the network of Academic Incubators of Entrepreneurship (AIPs) under agreements with HEIs. The Foundation is headquartered in Warsaw and represents the legal entity for each of the individual centres. It provides financial and administrative services for the AIP incubators in the network and their projects.

The Foundation of Academic Incubators of Entrepreneurship also operates "Business Links", which is a network of five locations that provide a virtual address, co-working space, technical and organisational support, networking and pro-innovative services, to entrepreneurs and their companies during the pre-incubation and incubation phases. These centres differ from AIPs in that they offer space for student entrepreneurs to operate their business.

The AIP Foundation offers seed capital to companies operating in the AIP Business Link network. AIP Seed Capital offers PLN 100 000 (approximately EUR 22 750) in exchange for a 15% stake in the company. Calls are open monthly for companies seeking seed capital. Companies that receive seed funding may also be eligible for a second round of investment to grow their business internationally.

Student research circles

Another resource for supporting student entrepreneurs in Polish HEIs is student research circles, which are student clubs. These clubs have a sponsor from the university, who is typically a professor in the relevant field. The clubs are operated by students but the professors provide mentorship and advice when needed. Clubs focus on specific themes

and most focus on scientific research or innovative technologies. However, there are a number that focus on business start-up (Box 5.2).

Box 5.2. **Examples of student research circles supporting entrepreneurship at SGH Warsaw School of Economics**

Start-ups and Innovations Student's Science Club (*SKN Start-upów Innowacjii*)

The goal of this club is to promote entrepreneurship, focusing on eco-innovation, social innovation, and business creative solutions. The club was established in November 2015 and has a number of activities, including setting up opportunities for students to shadow start-ups in Warsaw to gain experience with business creation and management. One of its key projects for this academic year is to prepare a series of interactive workshops for students to meet and learn from entrepreneurs. The club currently has 21 members.

Students' Business Club

This club actively promotes entrepreneurship and business education through a number of events such as "Let's StartUp!", Dragon's Den, Tech Expo and Start-up Bridge. One of its best-known projects is "3-Day Startup", which is an international event that is organised in co-operation with several large multi-national corporations such as Microsoft, Deloitte, P&G, and more. It is one of the largest clubs at the university, with more than 170 current members and alumni.

Consulting Club (*SKN KONSULTINGU, Szkoła Główna Handlowa*)

The goal of the consulting club is to help members acquire and improve their business management and soft skills. The club was established in 1998 and co-operates with Institute of Risk Management. Members have weekly meetings and can work on organisational projects. It also offers consulting services to companies operating in Warsaw. The club has 80 active members and has an alumni network for more than 200 people.

Project Management Business Club (*Studenckie Koła Naukowe Zarządzania Projektami SGH*)

This club aims to promote innovative solutions and best practice project management standards in the academic and business environments. It is an interdisciplinary club that has two main projects. First, "Project Management Days" is a 3-day event of lectures and workshops led by project management specialists. Last year there were 25 lectures on project management basics, soft skills, project management tools and projects in lines of business, and 200 participants. The event was prepared by a team of 20 club members. The second project helps the technical robomatic club at the WUT Warsaw University of Technology to manage its project to build a solar powered boat for an international competition in Monaco. The club has 60 active members.

Business accelerators

Business accelerators typically offer a short boot camp for entrepreneurs with high potential ideas to help them learn about product and customer development, and to build networks. Most incubators in Poland are funded by private foundations or major telecommunication companies. Business accelerators are not common at Polish HEIs, but KU Kozminski University has recently launched GrowPoint (Box 5.3) and the AIP Foundation operates a small network of accelerators called Business Link.

Box 5.3. **GrowPoint, KU Kozminski University**

GrowPoint is a new acceleration programme for students and alumni of KU Kozminski University. It offers a three month acceleration programme to projects that are related to new technologies. The support includes training, workshops and mentorship. Nearly 50 experts and practitioners have been enlisted to provide the support, which will be organised according to the needs of individuals and their projects.

Applications for the first cohort of participants were received as of March 2016 and ten projects were selected. The first programme ended in June 2016 with presentations of the proposed business ventures to potential investors, strategic partners and media.

In addition, GrowPoint will also hold a series of events organised at KU Kozminski University to inspire the student body to build skills, knowledge and experience in entrepreneurship and innovation.

For more information, please see: *http://growpoint.pl/#home*.

Technology Transfer Offices

Technology Transfer Offices (TTOs) are a common approach to support university spin-outs in Poland. Their role typically includes the provision of legal advice and information to academic staff, and support for the protection of intellectual property. Target clients are almost exclusively academic staff, doctoral students and students. While these offices usually function within a university, they may correspond also to a separate legal entity.

Special purpose vehicles

The Law on Higher Education allows for the creation of "special-purpose vehicles" (SPVs) to commercialise research. These limited liability or joint-stock companies must be formed by the rector with the consent of the senate to manage intellectual property and income generated from commercial activities.

Technology incubators

Technology incubators are one of the older forms of start-up support in Poland, first appearing in 1990. These incubators target new innovative companies and offer premises for business activity, common areas for networking, office support services, accounting services, business counselling, training and information services, assistance accessing capital and help with technology transfer. Some technology incubators also provide pre-incubation services that provide basic start-up training and help potential entrepreneurs become "investor ready". Technology incubators are typically developed with support from public funds, notably from the European Union.

Students, doctoral students and university researchers operate approximately 40% of the start-ups in Technology Incubators.

Technology parks

Technology parks aim to build co-operative relationships between the business and scientific communities, support the creation of new technology companies and develop local business networks and clusters. They provide entrepreneurs with premises as well as access to technical infrastructure. This includes access to technology incubators at

two-thirds of technology parks and access to science laboratories in nearly half of technology parks. In addition, business development services are provided, including business counselling, technology transfer support and support with network building. Co-operation between technology parks and financers such as venture capitalists, business angels and other investors is growing, but these partnerships are in an early stage of development.

Technology park residents are comprised nearly entirely of small and medium-sized enterprises. University spin-offs and spin-outs account for slightly more than 10% of residents.

Technology parks in Poland are financed largely from grants and subsidies. Municipal authorities and academic institutions are the biggest investors in the partnership enterprises which govern the parks. For example, the Lublin Science and Technology Park (Box 5.4) was jointly established by the regional government and an HEI.

Box 5.4. **The Lublin Science and Technology Park**

The Lublin Science and Technology Park contributes to the Lublin Region Development Strategy by promoting innovation and supporting the launch of new technologies, and by strengthening the linkages between universities and business entities in the region.

It was established in 2005 by the Lublin regional government and the University of Life Sciences in Lublin to help transfer knowledge from researchers to entrepreneurs. It has a multi-function facility that provides workspace for entrepreneurs and scientists, as well as common areas for networking events. The science park also provides training courses for entrepreneurs and researchers and undertakes research activities within joint research centres hosted at the participating organisations (e.g. the Biotechnology Centre; the Electronics, Optical Electronics and Teleinformatics Research Centre; the Research Centre for Environmental Protection; and the Nanotechnology Centre).

The Lublin Science and Technology Park is member of IASP (International Association of Science Parks and Areas of Innovation).

For more information, please see: *http://en.lpnt.pl*.

Access to finance

Various sources of financing are available to graduate start-ups, including public subsidies, bank credits, seed capital, business angels and venture capital funds. One of the key publicly-supported access to finance measures is the AIP Seed Capital Programme. This provides start-up companies within AIPs with investments in the amount of PLN 100 000 (approximately EUR 23 600), in exchange for a 15% stake in the start-up. The AIP Foundation also introduces graduate entrepreneurs to potential investors.

In addition, business start-up grants for youth entrepreneurs are financed from the Labour Fund or the European Social Fund. Grants offered from the Labour Fund are typically intended for unemployed people who are registered with the district labour office or graduates of social integration centres or social integration clubs. Entrepreneurs starting from unemployment can receive up to 600% of the national average monthly salary. The applicant is required to run the business for at least 12 months, otherwise the grant must be repaid. Youth are able to access these grants.

Regional Operational Programmes for 2014-2020 offer grants and loans for start-ups under the following Priority Axes: Labour Market, Regional Labour Market, Employment. Youth and graduates under 25 years old are eligible for such programmes in eight regions. Regional Operational Programmes have been approved by the European Commission for the current programming period (2014-20) and need to be developed further and implemented.

Equity finance instruments remain under-developed in Poland relative to other European Union countries. Venture capital investments as a percentage of GDP, for example, were only one-tenth of the EU28 average in 2015, both because equity financing is not widely available and because Polish SMEs have a lower preference for equity-type financial instruments than their peers in other EU countries (ECB, 2016). However, the Polish government has recently taken action to address these issues. The Polish Growth Fund of Funds was established in 2013 to stimulate equity investments into growth-focused enterprises, and the National Capital Fund is being refocused on venture capital funds supporting the start-up phase of innovative SMEs. In addition, NewConnect, the specialised platform for SME listings, which is part of the Warsaw Stock Exchange, benefits from a regulatory architecture designed for smaller enterprises. In addition, the 2016 draft "Plan for Responsible Development" aims to foster business investment and innovation by reforming public aid for firms, creating a Polish Development Fund, merging the state-owned development bank and other public institutions to support entrepreneurship and SMEs, promoting efficient use of EU funds and encouraging savings and employee equity ownership plans. Graduates and staff with appropriate projects will be able to benefit from these measures.

5.3. Analysis and findings

HEIs offer a broad range of start-up support services

A wide variety of start-up supports are available at Polish HEIs through various actors within the HEI, notably career offices and AIP incubators (Figure 5.1). Overall the offering is quite comprehensive. Mentoring support is not widely available, however, especially from mentors who are from the business community. Another area where support could be strengthened is in the provision of business development services. Very little is currently available.

There is a noticeable gap between the support offerings of non-public HEIs and public HEIs. Non-public HEIs tend to offer a much more complete suite of supports than public HEIs and tend to have stronger links with the business community. The non-public KU Kozminski University, for example, was able to demonstrate a deep integration with off-campus business support providers.

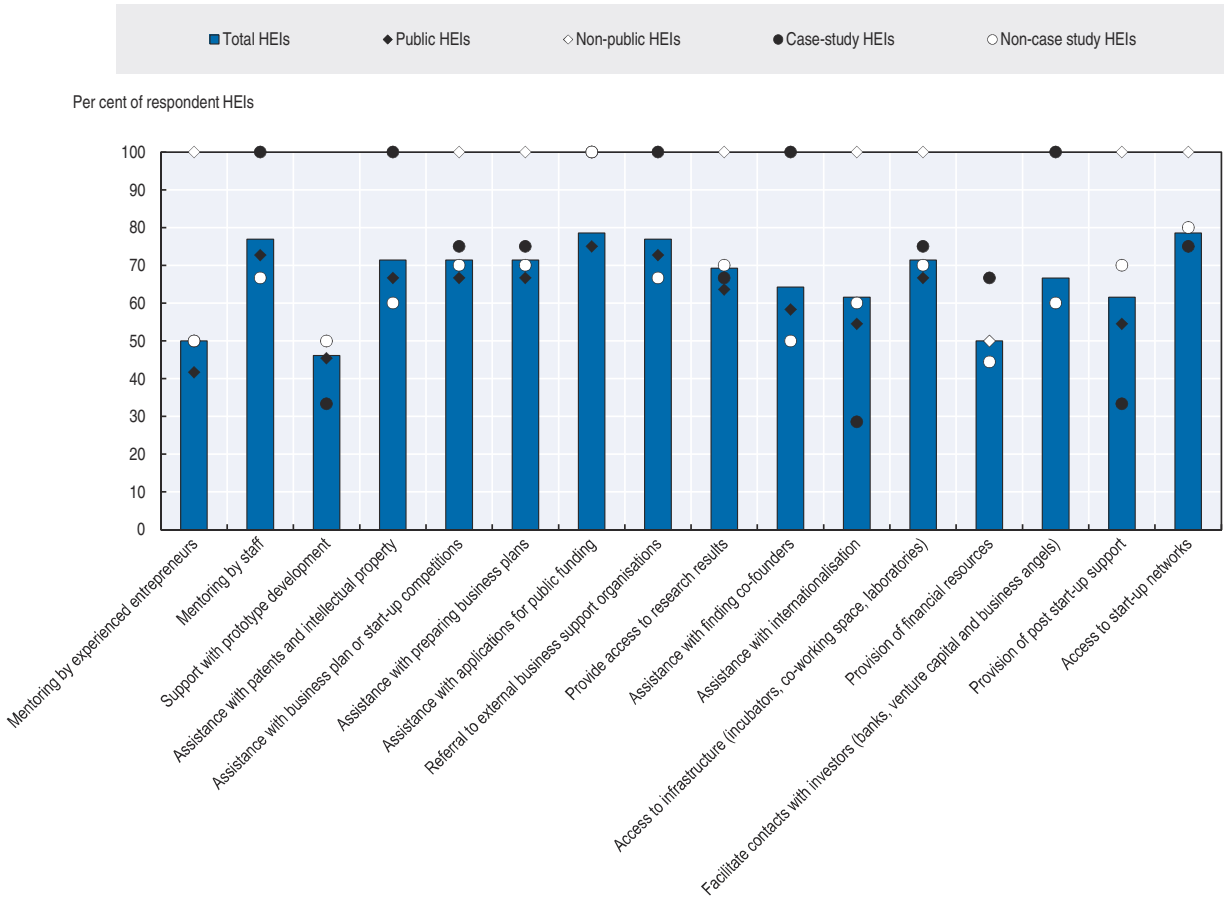
Awareness of start-up support among students is low

Despite the larger number of organisations in Poland to support students in business start-up, awareness about these supports appears to be quite low among students. Results from the HEInnovate Student Survey indicate that only 37% of students who responded (n = 1 963) are aware of a contact point at their HEI who they could go to for information and support on starting a business. This number is much lower than expected given that all of the HEIs have career offices that are active in this area and most have AIP incubators and professors who teach relevant courses.

It should be recognised that many of these activities are relatively new and HEIs are working to address the information gap. All HEIs that responded to the HEI Leader Survey

Figure 5.1. **Start-up supports offered**

"What special support measures are currently offered at your HEI?"



Note: Total number of respondents was 14, of which 12 were public HEIs, 2 were non-public HEIs; 4 were case study HEIs and 10 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

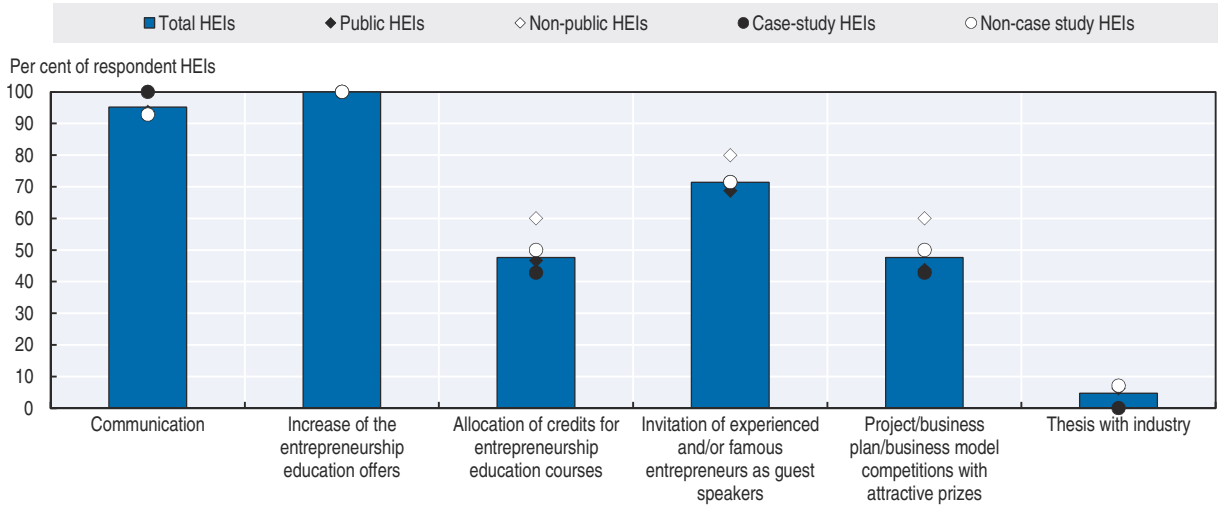
indicated that they are working to increase the capacity of their start-up supports, as well as student participation rates. However, results from the HEI Leader Survey (Figure 5.2) also suggest that the HEIs are using passive methods to reach students. Most communication methods are online (e.g. websites, Facebook, mailing lists) or are events (Figure 5.3), which all require students to be already looking for the information. The majority of HEIs also try to promote their entrepreneurship support activities through their related course offerings. This is an effective method but the reach will be limited to those already interested in the topic. More active promotion, such as joint projects with industry, can be undertaken by most faculties and courses but less than half of the HEIs do so. Very few HEIs attempt to make linkages between thesis projects with industry and their start-ups supports.

The infrastructure to support academic staff is strong

Academic staff are an important target group of start-up support in Polish HEIs. The HEI Leader Survey indicates that approximately half of Polish HEIs view researchers, professors and other staff as a primary target group for start-up support services (Figure 5.4).

Figure 5.2. **Promotion of entrepreneurship supports**

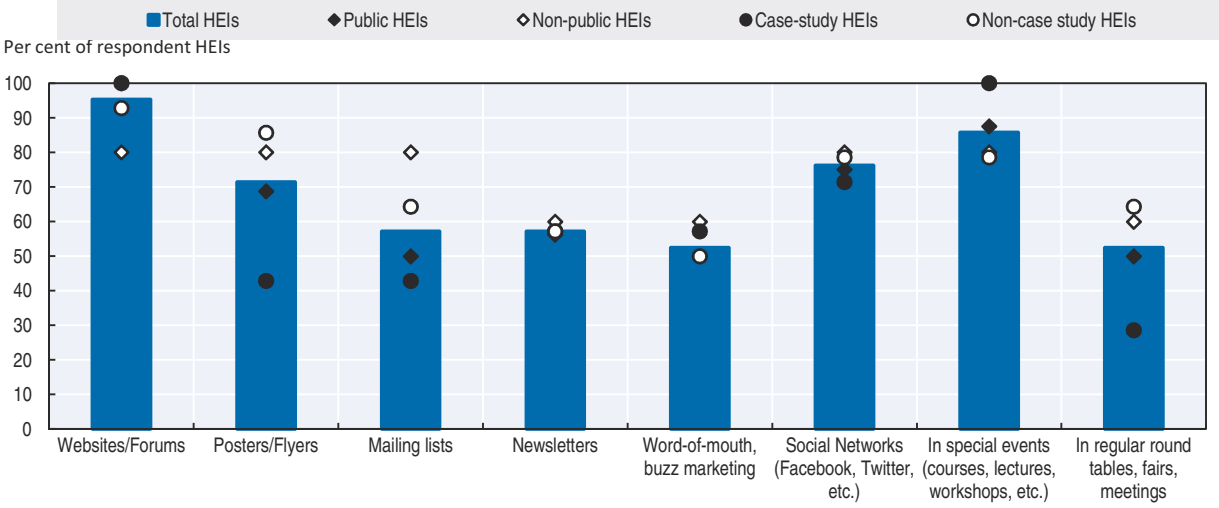
"What measures does your HEI implement to increase participation rates in entrepreneurship support activities?"



Note: Total number of respondents was 21, of which 16 were public HEIs, 5 were non-public HEIs; 7 were case study HEIs and 14 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

Figure 5.3. **Advertising entrepreneurship supports**

"How does your HEI advertise the entrepreneurship support activities that are organised outside study curricula/programmes or open across faculties?"

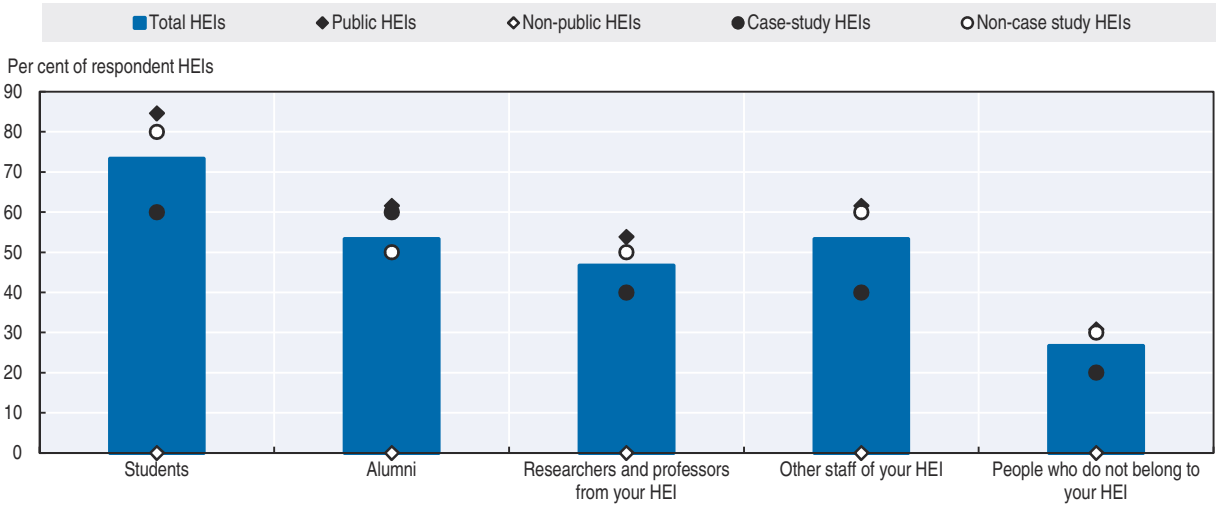


Note: Total number of respondents was 21, of which 16 were public HEIs, 5 were non-public HEIs; 7 were case study HEIs and 14 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

The supports offered to academic staff and researchers are comprehensive. All of the visited HEIs had centres that were designed to support staff in taking research to market, including Technology Transfer Offices and special purpose vehicles that are set-up for specific projects. Support services available include legal advice, support with intellectual property management and some match-making with industry and assistance with seeking investors. While the support services are generally high quality, take-up is low among researchers. At most of the HEIs visited, only one to three projects are patented and taken

Figure 5.4. **Targets groups of start-up support**

"Are the following target groups of start-up support activities?"



Note: Total number of respondents was 15, of which 13 were public HEIs, 2 were non-public HEIs; 5 were case study HEIs and 10 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

to market each year. One of the most substantial challenges is the opportunity cost of time for academic staff. Many are focussed on their academic career and spending time on commercialising research projects may result in some financial gain but takes away from their ability to publish academic work, which may end up hurting their career.

A second challenge is resources. The support offered by HEIs is typically delivered by a small team who are faced with substantial limits in their time and financial resources. For example, several of the HEIs visited noted that they only have enough resources to protect intellectual property within Poland as they cannot afford to file international patents. This is a disincentive for researchers to try to commercialise their work.

Despite these challenges, there are examples of successful projects that have been taken to market, such as C-Eye at the GUT Gdansk University of Technology (Box 5.5). Most of the HEIs visited are trying to scale-up activities in these areas. For example, the WUT Warsaw University of Technology recently opened the Centre for Innovation and Technology Transfer Management to provide more and higher quality support for researchers and to strengthen linkages between academic researchers and industry (Box 5.6). These types of efforts can be supported by the European Union's new Smart Specialisation funds that require industry to partner with HEIs.

Start-up support for students could be more sophisticated and of higher quality

The start-up support offered by Polish HEIs tends to be quite basic and the student survey suggests that students are generally not satisfied with most of the supports offered. For most types of support, more students reported that improvement was needed than those who indicated that the current offerings were sufficient. This is especially true for more intensive forms of support (e.g. prototype development, mentoring) and with business development and growth support (e.g. post start-up support, assistance with internationalisation). Students were more satisfied with access to infrastructure, access to research results and support with intellectual property management (Figure 5.5).

At the same time, HEIs report that students are increasingly demanding more intensive support, notably assistance with business plans and business competitions, access to support infrastructure and mentoring support (Figure 5.6). This is especially true at non-public HEIs where half of HEI leaders reported an increase in demand for support with business plans and competitions and all reported an increase in demand for mentoring.

Box 5.5. **Example of commercialisation, Cyber Eye at GUT Gdansk University of Technology**

The C-Eye System is a commercial result of the CyberEye project. It is a tool that assists in the evaluation of neurorehabilitation by stimulating senses and cognitive performance of patients suffering from neurological disorders. Diagnosis relies on eye tracking technology that was developed by the research project. The evaluation consists of reactions and tasks association with multimedia content (e.g. graphics, photographs, text). The patient's nervous system is stimulated and evaluated through eye tracking technology that was developed by the CyberEye project. The tool can also be used for communication and entertainment purposes.

In March 2013, the CyberEye System was awarded "Polish Invention of 2013" by viewers of the Polish Public Television.

Box 5.6. **The Centre for Innovation and Technology Transfer Management of WUT Warsaw University of Technology**

The Centre for Innovation and Technology Transfer Management of WUT Warsaw University of Technology (CZIiTT PW) supports academic entrepreneurship in Warsaw by linking research and scientific work, and stimulating co-operation between the scientific community and the business community. The Centre's motto is: "For innovativeness of WUT Warsaw University of Technology, Warsaw and Masovia."

Key activities of the Centre include:

- Create a strong research centre and infrastructure to support entrepreneurship, technology transfer, and innovation- and entrepreneurship-oriented education;
- Undertake entrepreneurship- and innovation-oriented research and science;
- Monitor technology markets in the Technology Observatory;
- Offer business support and a location for co-operation for the business community, local authorities and researchers; and
- Strengthen the WUT Warsaw University of Technology's technology transfer and commercialisation activities, taking into account effective use of the potential of the student community.

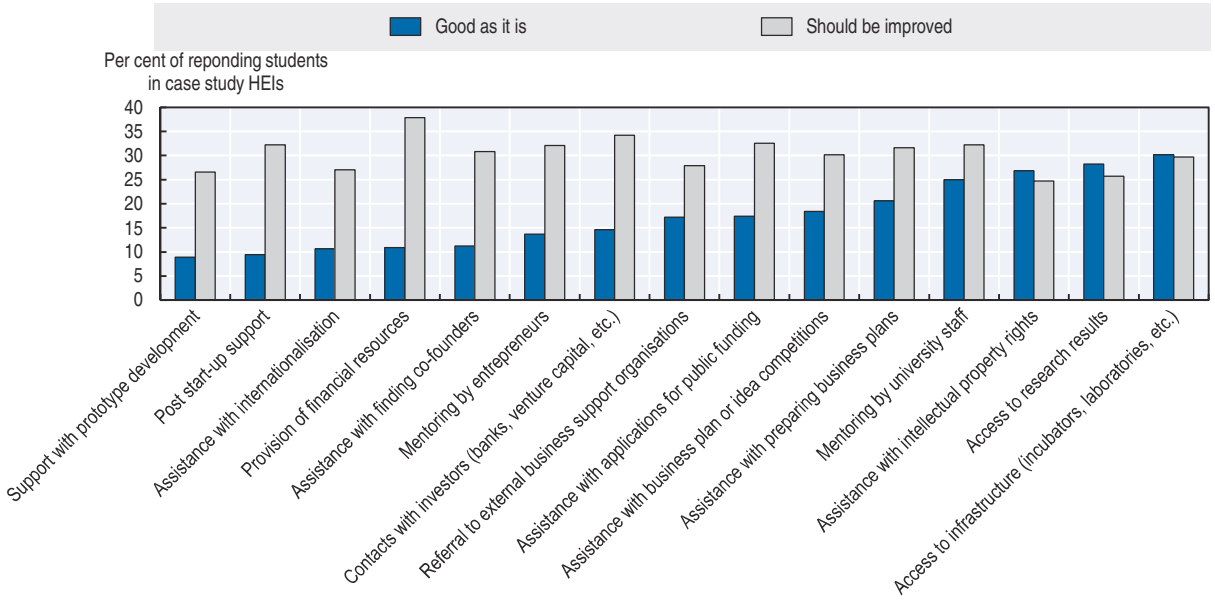
The Centre opened in late 2015. Its building has six floors and a total area of 13 270.94 m^2. The total value of the project was PLN 74.73 (approximately EUR 17 million). It is co-funded from the EU Regional Development Fund as part of the Regional Operational Programme for the Masovia Voivodship 2007-13 at the level of PLN 59.5 million (approximately EUR 13.5 million).

There is potential to strengthen linkages with other actors in the entrepreneurship support system

Only approximately 18% of respondents to the student survey indicated that their HEI adequately makes referrals to external business support organisations. This can leave gaps

Figure 5.5. **Student assessment of start-up support**

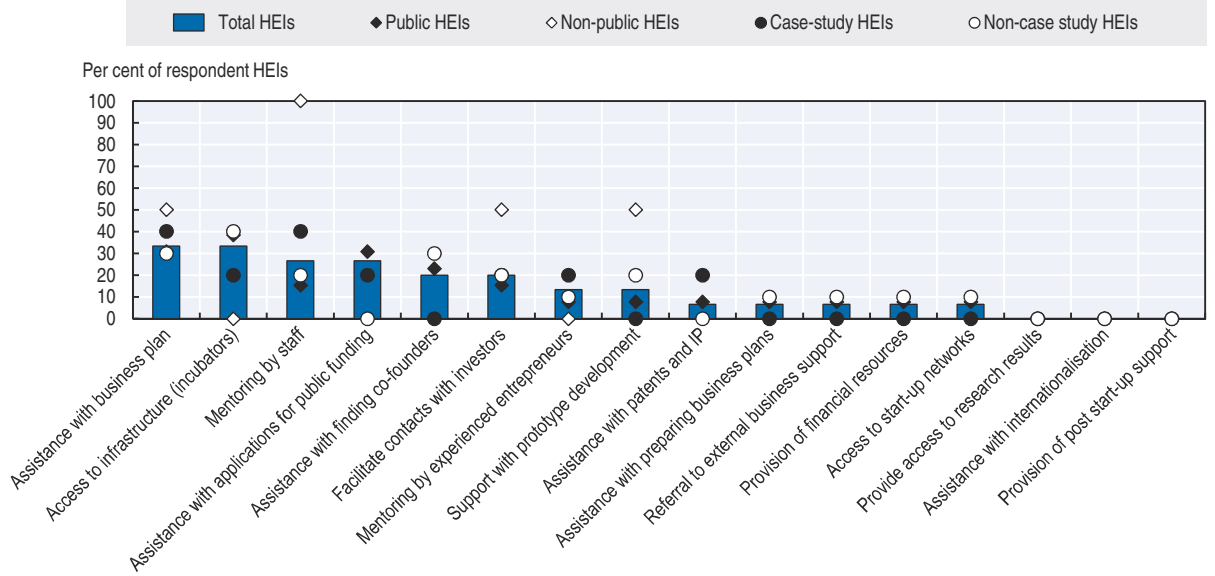
"How would you rate the overall quality of following start-up support measures?"



Note: 1 205 students responded to this question.
Source: OECD (2016b), *OECD HEInnovate Student Survey Poland*.

Figure 5.6. **Start-up supports that are increasingly demanded**

"Which have been the three most demanded special support measures over the last two years?"



Note: Total number of respondents was 15, of which 13 were public HEIs, 2 were non-public HEIs; 5 were case study HEIs and 10 were not case study HEIs.
Source: OECD (2016), *OECD HEI Leader Survey Poland*.

in the support that student entrepreneurs can make use of. The support system within HEIs tends to focus on the very early stages of business development. External providers could be very complementary for later stages of business development. However, HEIs are not playing as strong a role as they could in co-ordinating access of students to this support.

Career offices have an important function in disseminating information about start-up supports and resources to students. In most HEIs, career office staff provide information in both ad hoc ways (i.e. when students request it) and through regularly organised events and workshops. However, established linkages to external business support organisations are relatively rare, and HEIs often are not taking a leadership role in linking to the external business support system.

Local governments can also play a key role in supporting the development of a business support system and connecting-in HEIs. For example, the City of Warsaw established an innovation council in 2012 that led to the development of an innovation strategy for the city. As part of this strategy, the city has funds to support start-ups with grants and to provide training sessions. The city is currently working on a proposal for entrepreneurship education. A strong start-up support infrastructure exists, including a city-operated incubator and a support centre for the creative sector (a second is planned). The city also promotes relationships with several HEIs but noted that they tend to work with individual professors rather than institutions because these relationships are easier to set up and maintain.

5.4. Conclusions and recommendations

Increase mentoring capacity for student entrepreneurs

While some mentoring support is available from professors and to a lesser extent, entrepreneurs, this is not a strong element of the business start-up support provided by HEIs in Poland. Mentoring is important for student entrepreneurs for many reasons. It provides knowledge transfer assistance in a personal manner that is tailored to the needs of the student. It is also important because it can help expand a young entrepreneur's network which can be important for finding partners and future customers. Often the most valuable support and advice an entrepreneur can receive is the knowledge of whom to go to in order to gain further resources to develop the business.

Delivering mentoring support is a challenge for many HEIs in the European Union because it falls outside of traditional learning activities. An approach used by successful "entrepreneurial" HEIs is to engage alumni who are active in the business community. Although HEIs in Poland have not invested strongly in building and maintaining relationships with their alumni, many of the HEIs have recently been investing in career offices and alumni associations to maintain a link with graduates.

Alumni should be an attractive resource for HEIs to support student entrepreneurs because many of them would likely agree to voluntarily mentor students. The will and urge to "give back" to the university (and society) from experienced business people is a way to create relations and secure knowledge sharing that is not biased by any organisation's or governmental point of view. Alumni can be an invaluable resource, especially in a context where financial resources are limited. A model of how entrepreneurship support can be built up with alumni and few resources can be found at the University of Strathclyde in Scotland (Box 5.7).

Alternatively, professional coaches could be used to guide students in their projects, or to participate in entrepreneurship events.

Box 5.7. **Entrepreneurship support at the University of Strathclyde, Scotland: its evolution and involvement of alumni**

Description

The University of Strathclyde is based in Glasgow in the West of Scotland, a region that relied on heavy industry from the Industrial Revolution until rapid de-industrialisation in the 1980s. The University was a pioneer in encouraging university spin-outs and cross-faculty entrepreneurship education and opened one of the UK's first university business incubators in the 1990s. It has since developed a wide range of services for start-up entrepreneurs funded from a mix of internal, public and private sources. Typically, small-scale internally funded initiatives have been expanded with long-term "equity" funding from alumni and finance houses and limited life "grant" funding from regional, national and EU government agency programmes. As pump-priming grants end, the University has reverted to in-house funding at sustainable (often lower) levels, supplemented by voluntary work of students and alumni. New activities are continually being piloted.

The university provides a full range of "soft" to "hard" start-up support activities for staff, students and alumni entrepreneurs. These range from for-credit entrepreneurship education at one end through enterprise training, mentoring, networking and encouragement activities, to small grant schemes, significant equity investment funds, and in-house incubation facilities. These are delivered by a variety of service and academic departments, often working together to deliver activities. Co-ordination is provided by a monthly "Enterprise Forum" administration meeting under the chairmanship of the senior officer with responsibility for Knowledge Exchange.

The Hunter Centre for Entrepreneurship (HCE) currently has 12 full-time research faculty, including three full professors and 15 PhD students. The Technology Transfer Office (TTO) has a full-time spin-out manager, IP manager, enterprise advisor, and an administrator for the Strathclyde Entrepreneurial Network. An alumni events manager is shared between the TTO office and the Alumni and Development Office. There are 45 Enterprise Partners, who are experienced alumni volunteers that mentor younger entrepreneurs. Through the "Enterprise VIP", MBA students, trained by the HCE, coach students, staff and alumni entrepreneurs who are developing and testing new enterprise ideas. The business incubator has three full-time staff and is based in a central campus building.

After having been runner-up as UK Entrepreneurial University of the Year in 2009, Strathclyde was awarded UK University of the Year 2012. Strathclyde was ranked 2nd in Scotland and 7th in the UK in terms of spin-out formation between 2001 and 2011. It has formed over 50 spin-out companies, of which around 40 are still trading in some form, with sales of approximately GBP 80 million per annum (approximately EUR 91 million) and employing around 700 people. All major initiatives are still operating after the ending of initial funding.

The following provides some highlights of the evolution of entrepreneurship support at the University of Strathclyde and indicates how different initiatives were funded. These initiatives were funded from a wide range of sources including government, private sector, other universities and internal funding.

- 1990: Strathclyde opens Scotland's first university incubator (Strathclyde University Incubator: SUI) with equal funding from the university, an enterprise agency, a bank and a venture capital house.
- 1996: Strathclyde Entrepreneurship Initiative (SEI) opens with internal funding from the Principal's Office to make entrepreneurship electives available to all students.

Box 5.7. **Entrepreneurship support at the University of Strathclyde, Scotland: its evolution and involvement of alumni** *(cont.)*

- 1999: Technology Entrepreneurship for Postgraduates, an evening training programme, started at SEI, funded by a neighbouring university (in return for teaching provision), regional and city enterprise agencies, ERDF, and a private educational trust. Strathclyde with a neighbouring university were awarded GBP 3.3 million (approximately EUR 5.1 million) of government funding for a professionally managed seed capital fund (jointly funded with a Trust and a charitable foundation).
- 2000: SEI was renamed the Hunter Centre for Entrepreneurship (HCE) following a GBP 5 million endowment from Sir Tom Hunter, alumnus, entrepreneur and philanthropist. A Business Plan Competition was launched, managed by an alumnus entrepreneur-in-residence with GBP 40 000 prize money (approximately EUR 64 000) from an enterprise agency and a bank. Strathclyde with four other Scottish universities were awarded GBP 4 million (approximately EUR 6.4 million) funding for the "Scottish Institute for Enterprise" (SIE) from UK Government "Science Enterprise Challenge" Fund, enabling student business advisors and an additional lecturer to be hired.
- 2002: Annual day-long "Celebration of Entrepreneurship" was launched with events for students, staff, alumni and the community with funding from private sector sponsors.
- 2003: Strathclyde 100 (S100) was launched, which is an exclusive invitation-only network of successful alumni and friends of the university that meets three or four times per year to listen and give feedback to new businesses started by students, staff and alumni. It is led and funded by Alumni and Development Office and S100 members volunteer to mentor early-stage entrepreneurs.
- 2004: Strathclyde Entrepreneurial Network (SEN) was launched for entrepreneurial students and young alumni. It is a series of networking events run by TTO staff and a student champion funded by Scottish Institute for Enterprise (SIE).
- 2005: GBP 950 000 SEEKIT funding (Scottish Government and ERDF) (approximately EUR 1.4 million) was secured by the TTO to grow services to young alumni entrepreneurs (e.g. advisors, events, networking) for three years and the funding was renewed for another three years in 2008.
- 2008: A new fund for spin-outs was created with Braveheart, a Scottish venture capital company.
- 2011: Strathclyde Academy of Distinguished Entrepreneurs (a Hall of Fame) launched as a low-cost reward system for alumni.
- 2012: SUI launches Gabriel Investments, a business angel syndicate to channel start-up funds to high quality start-ups and a 6-week Enterprise Academy was launched for students, run by VIP students.

Enterprise activities fit the university's mission as "the place of useful learning" and are encouraged because they contribute to the university's "third mission" of knowledge exchange, to building long- term relationships with alumni, and to supporting the careers of faculty and alumni. Enterprise activities at Strathclyde rely on co-operation and co-ordination between service and academic departments working together on many different projects and leveraging the goodwill and energy of students and alumni. There has been encouragement of innovation from below rather than central planning of an over-arching "enterprise strategy", but senior officers play a vital co-ordinating role.

Box 5.7. **Entrepreneurship support at the University of Strathclyde, Scotland: its evolution and involvement of alumni** *(cont.)*

Relevance for Poland

This example illustrates how entrepreneurship support can be built with few resources. Although public investments were required at various points in time, the university was successful at building up a base of supporters who contributed funding and in-kind contributions. The approach to building an alumni network, in particular, could be applied in Poland. This approach also has the benefit of strengthening ties between the HEI and the community.

Source: OECD (2013), "Stimulating entrepreneurial mindsets and behaviours in east German higher education: State of play and inspiring practices", available at: *www.oecd.org/site/cfecpr/OECD_Booklet_EN-Web.pdf*.

Academic staff and PhD students could also be used as mentors, as is already happening in a number of Polish HEIs. These mentors could be further supported with training in communication and business development. Furthermore, they would also benefit from other supports and resources such as good practice exchange platforms and more comprehensive information on the start-up support infrastructure in the community.

Strengthen linkages between HEIs and the business community

Much has been done but more efforts are needed to open up universities, so that business is aware of the services that HEIs could provide (e.g. access to laboratories and instruments, consultations, expert opinions, conducting research). Programmes such as "Innovation Vouchers" (Box 5.8) are an innovative idea that could be very effective in building linkages by providing businesses with subsidies and contacts enabling and encouraging them to work with HEIs of their choice on innovation projects. If this approach shows signs of success, the programme should be scaled-up and expanded into other regions.

Box 5.8. **Innovation vouchers, Poland**

The Polish innovation voucher programme seeks to stimulate co-operation between entrepreneurs and scientific researchers by providing co-funding to entrepreneurs who work with scientists to develop products and services, as well as production techniques and technologies. The goal is to promote innovation and improve competitiveness among micro, small and medium-sized businesses.

Entrepreneurs who work alone or operate micro-enterprises are eligible to receive co-funding of up to 80% of the value of projects between PLN 60 000 and PLN 400 000 (approximately EUR 13 600 to EUR 90 700). Medium-sized businesses can receive co-funding of up to 70%.

The national programme is managed by the Polish Agency for Enterprise Development (PARP). It implements the innovation vouchers within three operational programmes (OPs): OP Smart Growth, OP Eastern Poland and OP Knowledge Education Development.

Over the 2016-20 programming period, it is expected that approximately 2 300 entrepreneurs will be supported in the development of innovative products, services and designs, while another 1 500 will be supported in the development of new production technologies and process innovations.

Source: PARP (2016), "Services for enterprises", *https://en.parp.gov.pl/services-for-enterprises*.

In addition, investors should be encouraged to work more closely with HEIs to develop relationships with students and support the development of their entrepreneurial projects. Investors and HEIs could partner in organising business competitions for students that award prizes to fund start-up activities. HEIs should also explore the potential of receiving sponsorships from the financial industry to help fund entrepreneurship events and projects.

Develop more intensive support for high-potential graduate businesses

A more intensive strand of support would be warranted for the highest potential graduate businesses, particularly those with innovative ideas and ambitions to export. Since many of the high-potential businesses are likely to be commercialising university research, it is important to ensure strong linkages between HEI research and student and staff start-up activities. To facilitate this, a service could be introduced within incubators to help students, graduates and teachers at HEIs to think about the commercialisation potential of research or even master theses. Better integration of internal and external business support offers will also be particularly important for the highest-potential businesses, which are more likely to need the more intensive and specialised support available for larger businesses outside of the HEI. External support providers in particular could offer tailored training, coaching and mentoring support. High-potential graduate businesses are also more likely to need external financial support such as venture capital or business angels.

References

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PARP (2016), "Services for enterprises", *https://en.parp.gov.pl/services-for-enterprises*.

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.

Extracurricular 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 extracurricular opportunities
- Formally recognise extracurricular 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 extracurricular 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 whilst 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 student 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 Poland

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 on Poland's higher education transformation process towards an innovative, interconnected and multidisciplinary entrepreneurial system, designed to empower its students and staff to demonstrate enterprise, innovation and creativity in teaching, research and societal engagement. Using the OECD-European Commission HEInnovate guidance for the entrepreneurial and innovative higher education institution, the report assesses strategies and practices for entrepreneurship and innovation in Poland's higher education institutions and the systemic support provided by government.

Higher education institutions play a critical role in Poland's economy and innovation system, which is based on a strong and growing engagement agenda with industry and local communities, the emergence of new learning environments and strong multidisciplinary research teams. This report offers practical recommendations on how Poland can enhance and sustain the outcomes.

Consult this publication on line at ***http://dx.doi.org/10.1787/9789264270923-en***.

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