Higher Education in Regional and City Development

Wroclaw, Poland

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Higher Education in Regional and City Development: Wroclaw, Poland 2012



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Foreword

Universities and other higher education institutions can play a key role in human capital development and innovation systems in their cities and regions. Since 2005, the Reviews of Higher Education in Regional and City Development have been the OECD's tool to mobilise higher education for economic, social and cultural development of cities and regions. The reviews have analysed how the higher education system impacts local and regional development and helped improve this impact in more than 30 cities and regions in over 20 countries. They examine higher education institution's contribution to human capital and skills development; technology transfer and business innovation; social, cultural and environmental development; and regional capacity building. The review process is designed to facilitate partnership building in cities and regions by drawing together higher education institutions and public and private agencies to identify strategic goals and work together towards them.

The review of Wroclaw, the first of its kind in Poland, has taken place at a critical stage in the evolution of higher education in Wroclaw, in the development of the city and region and in the links between higher education and the city. The principal objective of the OECD review is to examine the links between the higher education institutions and the city of Wroclaw and the wider region, and to strengthen these links to the benefit of both. The two key questions in this respect are: How can the city and the wider region benefit from a stronger higher education system? In what ways can higher education institutions individually and collectively contribute to the economic, social and cultural development of Wroclaw and Lower Silesia.

Poland's regional development framework is directly linked to the European Union's policies and goals. Although Poland has been a member of the EU since 2004, the regional development framework remains a relatively new reality for decision makers and higher education institutions. While many Polish university leaders have decades of institutional experience and a strong record of excellence in research, regional development comes as a new responsibility, established by the Polish government in 2011 legislation on higher education. Hence this OECD

review has taken place in the context of a regional development system in the making.

It is our hope that this review will be helpful to Wroclaw, Lower Silesia and its diverse higher education sector. We also hope that Wroclaw's experience in this review will be an inspiration for higher education institutions and cities/regions in Poland and Eastern Central Europe that want to unleash the full potential of higher education for economic, social and cultural development.

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This publication draws on interviews carried out during a week-long review visit in 19-24 February 2012, on the findings of Wroclaw's Self-evaluation Report and using additional information provided to the review team. The OECD Review Team was also able to rely on a range of other OECD reports focusing on Poland, such as the OECD Reviews of Tertiary Education (2007), OECD Territorial Reviews (2008), the OECD Economic Survey (2010), OECD Studies on SMEs and Entrepreneurship (2010) and OECD Urban Policy Reviews (2011).

The review visit to Wroclaw was led by Jaana Puukka (OECD), the lead author of this publication, supported by Bonifacio Agapin. The other

members of the review team were Patrick Dubarle, John Goddard, Ellen Hazelkorn and Małgorzata Kuczera. Further details about the Review Team can be found in Annex A of this report. Bonifacio Agapin and Olivia Kelley provided technical support and Rachel Linden supervised the publication process.

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List of acronyms

BERD	Business Expenditure R&D
BIAC	Business Industry Advisory Committee to the OECD
CIT	Corporate income tax
DAIP	*Dolnośląski Akademicki Inkubator Przedsiębiorczości* The Lower Silesian Academic Incubator of Entrepreneurship
EACEA	Education, Audiovisual and Culture Executive Agency
ECTS	European Credit Transfer and Accumulation System
EHEA	European Higher Education Area
EIU	Economist Intelligence Unit
EU	European Union
EUA-CDE	European University Association – Council for Doctoral Education
EUR	Euro
FDI	Foreign direct investment
FP7	European Union Seventh Framework Programme
GDP	Gross domestic product
GDER	Gross domestic expenditure on research and development
GUS	*Główny Urząd Statystyczny* Central Statistical Office of Poland
GVA	Gross value-added
HE	Higher Education
HEFCE	Higher Education Funding Council in England
IALS	International Adult Literacy Survey
ICT	Information and communication technology
IMHE	Institutional Management in Higher Education
ILO	International Labour Organisation
IP	Intellectual Property
ISCED	International Standard Classification of Education
IT	Information technology
LFS	Labour Force Survey

LLL	Life-long Learning
MRR	*Ministerstwo Rozwoju Regionalnego* Ministry of Regional Development
NQF	National Qualifications Framework
OECD	Organisation for Economic Development and Cooperation
PISA	Programme for International Student Assessment
PLN	Polish Zloty
PIT	Personal income tax
PSV	Post-secondary Vocational
RDI	Research development and innovation
ROP	Regional Operational Programme
RSI	Research innovation system
QA	Quality assurance
SAC	*Polska Komisja Akredytacyjna* Polish Accreditation Committee
SER	Self Evaluation Report
SES	Socio-economic status
SME	Small- and medium-sized enterprises
STEM	Science, technology, engineering, and mathematics.
SWPS	*Szkoła Wyższa Psychologii Społecznej* Warsaw School of Social Sciences and Humanities
THE-QS	Times Higher Education – Quacquarelli Symonds
TH-TR	Times Higher – Thompson Reuters
TTOs	Technology transfer offices
UIC	University-industry co-operation
ULS	*Dolnośląska Szkoła Wyższa* University of Lower Silesia
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United States
UK	United Kingdom
UW	*Uniwersytet Wrocławski* University of Wroclaw
VET	Vocational Education and Training
VHE	Vocational Higher Education
WB	World Bank
WCTT	Wroclaw Centre for Technology Transfer
WMU	*Uniwersytet Medyczny im. Piastów Śląskich we Wrocławiu* Wroclaw Medical University

WUE	*Uniwersytet Ekonomiczny we Wrocławiu* Wroclaw University of Economics
WUELS	*Uniwersytet Przyrodniczy we Wroclawiu* Wroclaw University of Environmental and Life Sciences
WUT	*Politechnika Wrocławska* Wroclaw University of Technology

Assessment and recommendations

Unleashing the potential of universities for Wroclaw's growth and development

Wroclaw is Poland's fourth largest city with a population of over 630 000 and 1.2 million in the metropolitan area. In less than ten years, Wroclaw has transformed itself from a declining industrial city into the economic engine of Lower Silesia. Building on its first mover advantage and business-friendly policies, Wroclaw has attracted significant amounts of mobile investments and European structural funds and now boasts a leading budget position among large Polish cities. Thanks to its focus on advanced services, Wroclaw is also leading the way from more jobs to better jobs. Key investments in the knowledge economy include Wroclaw's EIT+ Programme, a major effort to co-ordinate regional development policy for 2007-2013 in RDI, which is the largest single project in the national strategy, with a value of over a quarter of a billion Euros. Wroclaw has also invested EUR 2.5 billion in infrastructure and mobility with the aim of transforming itself into a cultural and creative knowledge hub that attracts mobile investments, talent and tourism. The city leadership is committed to utilising higher education as a key asset in Wroclaw's development. The large and fragmented higher education sector consists of 30 higher education institutions that serve more than 140 000 students and produce 20 000 graduates in public higher education institutions alone.

Wroclaw's economic development has been rapid, but not without problems. In 2005, a year after Poland's accession to the EU, the unemployment rate in the Wroclaw metro area was in double digits, with the rate of 10.9% for the city and 17.3% for the largest neighbouring district. In 2010 and 2011, the unemployment rate had stabilised at around 5% for Wroclaw, but it remained much higher for Lower Silesia (12.5% in 2011). Rapid economic growth has not remedied social and economic exclusion. The deprived inner-city areas and rural areas of Lower Silesia are affected by long-term unemployment and face mounting problems of social and

economic exclusion. Other challenges include tying down global mobile investment, raising the global competitiveness of indigenous businesses, securing the future of higher education in the city and defining Wroclaw's role in the Polish national system of cities.

Many of the achievements in Wroclaw and Lower Silesia have been made possible by massive investment from the European Structural Funds. While these European funds will continue to flow, a more strategic, innovation-oriented approach will be needed for the next programming period (starting in 2014), including better connection to the higher education system. The 2011 higher education law provides an opportunity to modernise universities and unleash their full potential for local and regional development to support Wroclaw's position in the global knowledge economy.

Currently, the locally and regionally relevant activities undertaken by Wroclaw's higher education institutions – including industry collaboration, skills development and entrepreneurship activities – are generally the result of city-driven or bottom-up processes and are not fully reflected in higher education policy or institutional set-up. There are gaps in important areas like lifelong learning, vocational tertiary education, work-based learning opportunities and support for small and medium-sized enterprises. This situation manifests itself in:

- A lack of strategic anchoring of local and regional development within universities and within the university "system" in Wroclaw. Regionally relevant action is dependent on the commitment of individual staff members or students, and not reflected in university strategic development, curriculum development or budget allocation. The funding system provides insufficient incentives to mobilise universities and individuals for regional and city development.
- Weak legitimacy of the needs of the city of Wroclaw and Lower Silesia within the universities. Wroclaw's universities have not yet taken a full advantage of the changes in national higher education policies that support the third mission of universities through teaching and research. Regionally and locally relevant activities are perceived as separate from research and teaching, which remain supply-driven, rather than demand-led.
- A co-ordination deficit within universities and the lack of processes capable of reconciling the competing agendas. University governance is based on a "federal" model in which individual departments are autonomous in relation to the central administration. Despite the recent changes in national policies the

university central administration has not yet developed a full capacity to exercise strategic leadership or influence horizontal areas, such as quality assurance, career development, industry collaboration and technology transfer.

- A co-ordination deficit within the higher education system and the lack of a long-term vision and inter-institutional mechanisms that can bring together different universities and competing strategic agendas. An absence of an integrated tertiary education sector with an underdeveloped postsecondary vocational sector and a lack of pathways. Joint university activity for the city/region and shared learning among universities remains informal, ad hoc and non-strategic. The vacuum has been filled by initiatives from the city administration. The coordination of information and action on the part of the various public agencies, universities and other stakeholders needs improvement.

- A weak evidence base. The system of information and data gathering about the local and regional environment, and the successes and failures of the activities by universities and intermediate agencies is limited in scope and quality. There is a lack of information and robust data in terms of skills gaps, socio-economic background of students, student progress, graduate employment, scope of work-based learning activities, industry demand for RDI, business formation and returns on public investment, which make it difficult to evaluate the outcomes of local and regional policies and institutional practices or design more effective policies.

To face these challenges, the Wroclaw community needs concerted efforts and a systematic approach to human capital and skills development as part of a broad-based, but clearly focused, regional innovation system. It needs to expand tertiary education opportunities by developing an integrated and coherent tertiary education sector and improving lifelong learning opportunities to reduce inequalities. Universities' learning programmes, RDI projects and community engagement activities should become more relevant, demand-driven and aligned with needs of the labour market, industry and existing and emerging clusters. Stronger incentives and improved governance systems are necessary to mobilise universities for local and regional development and improve their quality, productivity and international competitiveness. In order to improve regional development outcomes, evidence-based decision making needs to be strengthened within universities, as well at the national, regional and local levels.

Human capital and skills development in Wroclaw

A country or a city that wants to be globally competitive needs to have a highly skilled workforce and an economy that can absorb it. Poland and Wroclaw have made great strides in higher education, but continue to have a low wage economy. Against a backdrop of falling demand for higher education, they must rely more on high skill employment to move up the value chain.

Poland and Wroclaw have developed a mass higher education system in the past two decades. Between the academic years 1990/1991 and 2010/11, student enrolments in Poland grew 350% from 400 000 to over 1.8 million. The enrolment rate increased from 15% to 40% among 19-29 year olds, while Poland has maintained internationally high private and public returns on investment in higher education. Higher education participation in the Wroclaw metro area has also grown rapidly; 86% of Lower Silesia's students are concentrated in the city. With 140 000 students, representing more than one-fifth of its population, Wroclaw has transformed itself into one of Poland's most attractive student cities, where every third student comes from another region in the country.

To build long-term global competitiveness, Poland and Wroclaw need to move up the value chain by offering better skills and better jobs. In comparison to developed economies, more people in Poland and Wroclaw are employed in low- and medium-skill jobs. This is partly caused by the industry structure and foreign companies that shift production activities relying on cheap and relatively unskilled labour to Poland. To change this development trajectory, Poland and Wroclaw need to increase the stock of highly-skilled labour and make greater investment in activities that yield high-skill jobs by investing in RDI and knowledge transfer. Wroclaw is already moving in this direction. Between 2008 and 2010, Wroclaw's business service jobs doubled from 5 000 to 10 000. One out of three of these jobs are in R&D, making Wroclaw a national leader in the transition from more jobs to better jobs.

The end of the "demographic bubble" will expose Poland and Wroclaw to a shortage of skilled labour at the point when knowledge-intensive companies and businesses require more talent. The student demand has already stopped growing and may even decline due to the shrinking youth population. The number of 19-year-olds will continue to decrease every year until 2020, when it is estimated to be half the peak year 2002. According to

EURYDICE, by 2025 the total Polish student cohort will have declined by approximately 37% to 1.2 million students. This corresponds to a decline of almost 70 000 students, reducing the student population of Lower Silesia to 107 000 students and in Wroclaw to 88 000 students.

Falling demand will not only increase competition between universities in Poland and Wroclaw, but will also offer an opportunity to improve the efficiency, quality and relevance of the sector. The fragmented higher education sector in Wroclaw and Lower Silesia, which consists of 13 state universities and 17 non-public HEIs, will be under pressure. Great gains will be achieved if efficiency, quality and relevance improve in the university sector, particularly the two biggest universities – the University of Wroclaw and the Wroclaw University of Technology – that cater to almost half of all HE students in Wroclaw. At the same time, an increasing portion of Poland's and Wroclaw's population must be educated and trained to be able to meet the changing demand for skills.

Poland and Wroclaw need to improve the education system's efficiency by widening access to and ensuring success in tertiary education. Good quality pre-university education and developing an integrated and coherent tertiary education sector would ensure wider utilisation of skills.

A key determinant to equity in and efficiency of higher education lies in the quality of school education. Poland and Wroclaw have made significant improvements in the quality of school education and learning outcomes. Between 2000 and 2009, Poland raised the performance of its "lowest-achieving students while maintaining the performance level among its highest-achieving students" in PISA. Wroclaw has Poland's best learning results at the primary education level, but comes third in lower secondary education and second in upper secondary education. As a first mover among Polish cities, Wroclaw has introduced special scholarships for math and science students and included art and music in school curriculum.

While Wroclaw's universities have traditionally focused their efforts on recruiting talented students and collaborating with the best schools, there is scope for long-term, multi-stakeholder collaboration to improve students' motivation and academic performance at underperforming schools. This will be increasingly important in the future, as Wroclaw's schools need to serve not only Polish children with diverse skills and backgrounds, but also children from families of migrants in low-skilled jobs, as well as other under-represented groups such as Roma. Successful international examples

in this domain include the University of Victoria in Australia, which has achieved measurable success in widening access and improving success rates of students from low-income families.

The continuing demarcation between vocational and academic tracks in the secondary education system, reinforced by socio-economic status, suggests that education and labour market opportunities will continue to be stratified in Poland. One way to overcome this is to expand tertiary education opportunities by developing an integrated and coherent tertiary education sector including a stronger post-secondary vocational education and training sector and well-developed pathways. Learning pathways allow students from different backgrounds and with different career expectations to move from secondary education institutions to tertiary education and to maintain their knowledge and competences throughout their lives by availing of lifelong learning opportunities. In order to ensure wider and continuing access and opportunities for upskilling and re-training, Poland's National Qualifications Framework should include learning pathways as an explicit component.

At the regional and local level, collaborative efforts are needed to ensure that educational pathways are supported by credit recognition schemes, course and programme articulation agreements, clear policies related to credit transfer and increased support for joint programmes. Wroclaw's city administration could take a lead in facilitating stronger relationships among the different components of the education sector – universities, vocational higher education institutions and schools – so that they operate as an integrated developer of human capital potential.

Despite recent improvements in student support, higher education costs and fee policies are barriers to education in Poland. To ensure more equitable tertiary education, the financial, social and academic assistance to students requires strengthening.

The Polish Constitution guarantees free access to public higher education, but does not guarantee free education; more than half of all HE students pay tuition fees, including students in non-public higher education institutions (one-third of all higher education students) and those in part-time programmes in public institutions. Full-time study programmes in traditional public metropolitan universities are attended primarily by students of higher socio-economic status. At the same time, part-time, fee-paying students make up a large proportion of the students in public institutions, sometimes 40% or more of total enrolment, as is the case in the

University of Wroclaw and the University of Economics. Research studies indicate that students in paid programmes are more likely to come from less-affluent and less-educated families (Herbst and Rok, 2011). While these results should be treated with caution due to methodological problems (the individuals who left their family homes were excluded from the sample), they point to a possibility that the disadvantaged part of the population pays tuition fees and subsidises the public education to which it has limited access. The lack of robust data on students' socio-economic background and institutional levels, or about students benefitting for student programmes makes it difficult to evaluate the scope of this challenge.

An important element of equitable tertiary education is the financial assistance provided to disadvantaged students. According to OECD Education at Glance (2012) Polish higher education bases a heavy financial burden on families, which cover 19% of expenditure on higher education, more than in many countries where higher education is, in principle, free. In many countries, the financial burden that falls on families is alleviated by public subsidies for student grants, scholarships and loans. In Poland such subsidies are very low (1% of total expenditure) and as a result have very limited effect on the redistribution of the cost of tertiary education. Government authorities have recently decided to channel more funds to low income students and reduce the amount of merit-based aid. Consequently, 60% of the total student support will be distributed on need-basis and 40% on merit-basis. Additionally, a maximum income threshold for need-based aid has been raised by 30%. While it is too early to evaluate the outcomes of these changes, the grants remain modest in relation to the costs of living and the supply of loans is limited.

Developing a more supportive learning environment with adequate academic and social support for students would solidify Wroclaw's claims as a City of Knowledge. Concerns for efficiency in education or academic failure have not traditionally featured high on the agenda of Poland's and Wroclaw's universities. Additionally, the lack of data on students' academic progress has limited the possibility of estimating the need for academic and social support. Wroclaw universities could consider introducing formalised initiatives embedded within their policies for academic and social support to ensure equity in access to and progress in education. These formalised initiatives could be undertaken in tandem and on a collaborative basis between the universities in order to share best practice. Wroclaw's universities could also embark on monitoring the total student experience in order to assess the quality of higher education, encompassing teaching and learning, curriculum, student life, advising and mentoring.

Wroclaw's higher education is academically driven with limited labour market links. To improve the labour market relevance of education, universities should align their education programmes with the labour market needs and focus on students' learning process and outcomes.

While there is considerable variation among Wroclaw's universities in addressing the skill needs of the region, in general, higher education provision in Wroclaw remains academically-driven. The design of study programmes is supply-driven, based on the academic capacity of universities rather than the needs of the economy. The undergraduate programmes include limited evidence of interdisciplinary studies, new disciplines, or new pedagogical teaching and learning approaches. The overwhelming majority of students choose the traditional academic path following Bachelor and Masters pathways. Doctoral training follows a traditional format with few opportunities for work-based or industrial PhDs. Due to the lack of focus on employability, students undertake training outside of the educational system, which receives no credit and is not part of the curricula. The university careers services have an important role to play in linking students and graduates to the labour market, but they are poorly resourced and weakly connected to the academic heartland. Only a small minority of students benefit from important inter-university initiatives such as student mentoring.

Poland's government has acknowledged the need for stronger university-industry links. Wroclaw's universities could achieve this goal through a wide range of measures. They could more actively engage employers in the curriculum and course design and delivery. They could offer credit-bearing, work-based and/or co-operative learning for all students in collaboration with local industry and other employers. They could use local, private sector employees as instructors and encourage temporary movement of university researchers/teaching staff to the private sector. They could develop a comprehensive strategy for the internationalisation of the curriculum, including "global citizen initiatives" for the benefit of Wroclaw's education system and all students, not only those who are internationally mobile. Collaborative efforts between universities could strengthen the mission diversity, boost mobility between institutions and lead to cost savings. Scaling up and mainstreaming promising innovations like competence-based Wroclaw Graduate Model introduced by the city administration would also be useful. International examples from Canada, Denmark, UK and Australia could provide inspiration to Wroclaw's universities when they draft more student-centred and labour market-relevant learning models.

To enhance research training and research career development, Wroclaw's and Poland's universities could also consider introducing "structured doctoral programmes" that incorporate discipline/interdisciplinary courses or modules and transferable skills, and provide a framework for timely completion and industry collaboration. To pool resources, share expertise and to build international visibility, Wroclaw's universities could consider establishing a joint doctoral school.

The ageing society requires better utilisation of skills. Given the low activity rates and decreasing youth population, Wroclaw's education and training system needs to cater to older age groups. Re-skilling and up-skilling and other forms of lifelong learning should be scaled up.

As global competition and transition towards the knowledge economy intensify, it will become increasingly important for Poland and Wroclaw to ensure that older generations have up-to-date skills. This is especially important for Lower Silesia and Wroclaw because of the declining youth cohorts and location within a dynamic corridor in Eastern Europe. This is a challenge in Poland, which has a low participation in adult education. Compared to the OECD average of over 40% of adults, only 20% of adults in Poland participate in learning or training. Furthermore, entering students who are 25 and older form a small minority of all students and have no access to the national student support system.

In order to reduce inequalities in education and training participation by age and skill, Poland could consider a three-pronged approach: First, investment in lifelong learning at mid-career should be increased. Second, the attractiveness of training and its returns for older learners should be improved by adapting teaching methods and content to their needs, by the provision of short, modular courses and through the recognition of prior learning and experience. Third, later retirement should be promoted to encourage greater investment in training older learners. (See also OECD (2006), Live longer, Work Longer)

Wroclaw's universities need to engage more actively in lifelong learning opportunities and to be more responsive to the needs of adult learners and older workers who have been "locked out" due to changes in the economy/labour market. To date, Wroclaw's universities have remained more oriented to the needs of "traditional" students than to those of adult learners. Educational opportunities for mature students to facilitate career advancement or change through up-skilling or re-skilling remain limited and

are available only through part-time, tuition-based provision. The emerging new labour market and the current employment mix in Wroclaw and Lower Silesia require more robust provision to help upgrade manufacturing and services. In the STEM disciplines, where the government is hoping to underpin economic development in the future, the only opportunities for mature students in Wroclaw and Lower Silesia are in relatively basic information technology. Collaborative efforts in lifelong learning would be particularly useful.

Acknowledging the impact of demographic change and the needs of the multinational companies for specialised skills, Wroclaw's city administration has taken steps to attract and retain talent outside of Lower Silesia. Wroclaw has pioneered a number of high profile talent attraction campaigns such as the *Teraz Wroclaw* (Wroclaw Now), which brands the city as an attractive place for international students from Eastern Europe. Wroclaw's RDI arm, the Wroclaw Research Centre, attracts cutting-edge researchers, mainly of Polish origin. While the strategy to internationalise Wroclaw is a realistic and necessary response to the decrease of the traditional student cohort, it should not take priority over the need for lifelong learning.

For the Knowledge Metropolis to materialise, Wroclaw needs a co-ordinated strategy to develop a highly skilled workforce and an economy that can absorb this workforce. More robust performance measurement, data collection, benchmarking and shared learning is required at both national and local levels. The government should also take steps to prepare for the contracting higher education system.

If Wroclaw wants to forward its Knowledge Metropolis agenda, it needs a co-ordinated regional strategy ranging from secondary education to tertiary education and lifelong learning in order to develop a highly skilled workforce and an economy that can absorb this workforce. Building a stronger strategy for human capital and skills development in Wroclaw and Lower Silesia requires four key elements: First, robust data on the status of the region's human capital; second, a policy audit to identify barriers to meeting needs; third, regional/national policy to foster tertiary education institutions – including further, vocational and higher education institutions – with multiple, complementary missions aligned with regional needs; and fourth, a revision of student selection, finance policy (institutional, regional and national student support) and governance/regulation.

Poland's higher education system requires more robust performance measurement, data collection and benchmarking so that institutions and the government can track its progress. Universities need the common fact base provided by benchmarks to serve as an external reference for their own performance. As a follow up to the recent changes in the legislation, the Polish government could agree with universities on standard practices for recording and measuring productivity, particularly efficiency in graduate production, and publishing university productivity data. Without comprehensive and accessible data, institutions cannot be held accountable for their progress.

Finally, facing the contracting higher education sector, the Polish government should take steps to ensure sustainable sub-national provision of tertiary education and to provide guidance for successful merger and collaboration strategies. The government could consider conducting an assessment of current and planned capacity against anticipated student numbers in order to identify gaps/surpluses in staff and infrastructure by running a pilot review in Lower Silesia. Care should be taken to ensure that the population outside of major urban centres continues to have access to lifelong learning and business-related services through flexible, multi-provider learning and extension centres that draw on a range of providers. Learning from international examples collected, for example, by the Higher Education Funding Council in England (HEFCE) could help in preparing for a more structured downscaling of the system.

The following measures would promote human capital and skills development in Wroclaw

Recommendations for the national government

- Ensure that the National Qualifications Framework that is under preparation recognises and promotes a strong set of diverse post-secondary educational provisions, which provide a wide range of learning opportunities and student experiences, as well as facilitating learning pathways from secondary to lifelong learning.
- Reduce inequalities in education and training participation by age and skills by adopting a three-pronged strategy: First, increase investment in lifelong learning at mid-career. Second, improve the attractiveness of training and its returns for older learners by adapting teaching methods and content to their needs, by the provision of short, modular courses and through the recognition of

prior learning and experience. Third, promote later retirement to encourage greater investment in training older learners.

- Revisit the achievements of the Bologna Process and continue the process of curriculum reform to encourage flexible pathways and enhance mobility through credit accumulation across Poland and internationally in order to avoid superficial structural change.
- Carefully monitor the equity impacts of the current student financial support, particularly the scholarship model, for disadvantaged (low socio-economic status), mature and part-time students. Consider whether the student support system can be expanded and based on a system of means-tested grants, complemented with a universal, income contingent loan scheme, with fee waivers for the neediest students. Consider introducing a special financial incentive for institutions to attract under-represented groups and affirmative action to take applicants' educational backgrounds into account in the selection process. Establish initiatives for higher education institutions to widen access at the entry point and to support students from disadvantaged backgrounds as they progress through their studies.
- In collaboration with regional and local stakeholders and higher education institutions, assess current and planned capacity against anticipated student numbers in different regions. Encourage infrastructure-sharing arrangements between education providers and the establishment of tertiary education centres that draw on a range of providers.

Recommendations for the local/regional government

- Develop a co-ordinating structure and appropriate mechanisms to articulate a long-term vision and strategy for human capital and skills development stretching from primary education to tertiary education and lifelong learning. Outline clear qualitative and quantitative goals and confirm the respective contribution of individual institutions (or types of institution), building relationships among the different components of the education sector. Establish an information system to monitor the performance of higher education in the region and benchmark its progress with appropriate comparators in the country and with OECD countries. This requires: *i)* robust data on the status of the region's human capital, *ii)* a policy audit to identify barriers to meeting needs, *iii)* regional/national policy to foster higher education institutions with multiple,

complementary missions aligned with regional needs, and *iv)* possible revision of student selection, finance policy (institutional, regional and national student support) and governance/regulation. Develop data and information on: *i)* educational attainment rates benchmarked to country-level achievement, the OECD average and the best-performing OECD countries, *ii)* migration by educational level and age, *iii)* regional higher education participation rates (age groups including youth, adults; socio-economic status), *iv)* robust information on which institutions serve the region's population, *v)* labour market needs, *vi)* degrees awarded by regional tertiary education institutions and *vii)* functioning pathways between and among higher education institutions, as well as other levels of education.

- Create mechanisms for enhanced collaboration between HEIs, and between HEIs and the city/region, building on the successful examples of collaborative efforts such as Teraz Wroclaw.
- Map the post-secondary education landscape to help brand Wroclaw as a "region of knowledge".
- Consider launching a city-driven flagship programme to support women leadership in business, academia, arts and culture.
- Facilitate stronger, evidence-based strategic decision-making through robust data. The most effective region-wide graduate labour market systems are based on the collection of comprehensive labour market intelligence and online publication of the data in a single place. This improves students' ability to make rational choices about their studies, helps graduates and employers to come together and helps students find employment. Effective labour market systems use the data strategically to identify regional and institutional priorities and help higher education institutions respond in terms of course provision and the supply of employer-specified skills.
- Working with the HEIs and research institutes, create a Strategy for Human Capital Development to increase the supply of knowledge-intensive workers for sectors in which the region has a comparative advantage.

Recommendations for the universities and other HEIs

- Review the institutional profile and education provision to increase inter-disciplinarity, diversify learning methodologies and place the students at the centre of the learning process.

- Actively engage employers in curriculum development, invite professors from industry and encourage employment after the first cycle.
- Address the needs of a diverse student population and link this with the construction of flexible learning paths, which should include tertiary-type B post secondary education.
- Address the need for lifelong learning and more flexible modes of delivery for those who combine work and study.
- Embed compulsory employability skills, work-based learning, internships, entrepreneurialism, Intellectual Property consciousness, etc. in all programmes – including "structured" PhD programmes.
- Systematically monitor student progress, as well as students' labour market outcomes and graduate destinations. In developing quality assurance mechanisms, monitor not only student satisfaction, but also the total student experience, which includes services provided by the higher education institution and asses the quality of higher education, encompassing teaching and learning, curriculum, student life, advising and mentoring.

Research, development and innovation

Wroclaw's framework conditions for innovation have improved, but remain suboptimal. As a result, Wroclaw and Lower Silesia underperform in innovation and fail to take full advantage of the innovation potential of the large student population. There is a need to align the supply of skills with the demand from industries and clusters.

Lower Silesia, like many regions in Eastern Europe, is a "knowledge-absorbing region". The European Innovation Scoreboard ranks Lower Silesia at the 137th place among the EU regions in the group of "medium to low innovation performers". While Lower Silesia's innovative firms engage in more dynamic collaboration and the region has a greater intensity of innovation diffusion than Warsaw and its surroundings, firms in Lower Silesia continue to make limited investments in innovation. The neighbouring regions of Prague in the Czech Republic and Sachsen Anhalt in Germany all perform better in most segments of innovation activities.

One reason for Lower Silesia's modest performance in innovation is the below (national) average R&D spending of the region (0.4% of its gross value added) and the low share of innovative SMEs. This suggests that the competitiveness of Lower Silesia continues to rest on its wage cost advantage. Wroclaw has nonetheless developed some acknowledged strengths in university research, particularly in mathematics and information and communication technologies. About 9% of Wroclaw's higher education students are following ICT courses, half of them in computer science. This concentration of skills in information technologies is attracting large ICT companies, but inherited university governance models and practices remain an obstacle to faster change.

Another reason for Lower Silesia's modest innovation performance is the fragmentation of research capacities in universities. Universities are major actors in the science and research system in Poland, accounting for 37% of all R&D activity. Lower Silesia and Wroclaw have a large, but fragmented, higher education sector. Even if the two leading universities – the University of Wroclaw and the Wroclaw University of Technology – account for almost a half of all students, research is relatively dispersed within and between institutions. For example, the Wroclaw University of Technology runs half of the invention projects in Lower Silesia, but its R&D effort is scattered across 58 fields of research.

Due to lack of alignment between the supply of skills and industry demand, Lower Silesia, a heavyweight in industrial production and the Polish region with the fourth highest GDP, faces difficulties finding skilled manpower, notably engineers. For example, in ICT, an acknowledged area of strength, Wroclaw produced only 1 786 graduates in 2008. While the gap is less significant than in the rest of Poland, Wroclaw's universities continue to train significantly more students in the humanities, social sciences and administration than in engineering and ICT. Due to the projected decline in the number of graduates from vocational schools, it will be difficult to remedy the shortage of engineers and technicians unless major initiatives are taken by Wroclaw's leading universities. Recent changes in higher education legislation facilitate the development of a more relevant and demand-led education provision.

Wroclaw's universities have room for improvement in the context of addressing regional issues and forging stronger links with local companies and clusters. They can play a major role in strengthening the regional

innovation system (RIS), provided that they embark on coordinated and coherent initiatives in RDI and the supply of services.

Wroclaw's and Lower Silesia's regional innovation system is built on a relatively robust industrial base. Lower Silesia is an industrial region with a number of clusters and several branch plants of multinational companies that cover a large spectrum of activities including: automotive industries, household appliances, wood construction, renewable energy, mineral resources and electrotechnic equipment.

While Wroclaw's universities are Lower Silesia's largest R&D investors, they have thus far not played a major role in the regional innovation system within the region's industrial framework. Additionally, the EIT+ Research Centre's cutting-edge fields are more plugged into the global innovation system than the local and regional innovation system. Wroclaw's universities could improve demand-driven innovation and research in industries relevant to the region. This could be achieved in many ways. The business model of the technology transfer offices could be further developed so that the TTOs become more efficient and market-oriented. The longstanding Knowledge Transfer Partnerships (UK) could serve as an inspiration for developing the newly-established Mozart Programme into a more robust, people-based mobility scheme.

Wroclaw's universities and knowledge institutions need to overcome a number of barriers to improve their RDI performance. First, higher education R&D (HERD) in Poland and Wroclaw is low – about half of the OECD average. HERD financed by the private sector represents a marginal amount of funding, despite its relatively large share (10%). In addition, collaborative R&D is limited in volume. Second, universities' RDI is weakly aligned with Lower Silesia's key industries – the traditional and low-tech industries and service activities – that account for a significant part of the region's GDP. Third, university incubation and patenting activities remain embryonic, and spinoffs from university research scant when compared with leading knowledge hubs.

Part of the problem is the weak articulation of the business/industry demand for higher education services. A detailed investigation into the nature of innovation within Lower Silesia's firms, the barriers and problems faced, and the experiences of collaboration with universities could also help advance collaboration for local and regional innovation. Cluster development could be conceptualised across the industry-service divide to connect, for example, ICT with culture and tourism.

To facilitate knowledge transfer within the RIS and to bridge the gap between science and industry, a number of intermediary organisations have been created, including three science parks and the Wroclaw Centre for Technology Transfer (WCTT) within the Wroclaw University of Technology. The universities' involvement in the parks and incubators remains unsystematic and needs better articulation. Many co-operations are project-based and cease with the end of the project. Dialogue and partnerships among universities also remain limited to political, rather than strategic, involvement in the loose higher education confederation. The The EIT+ initiative, a science-based programme with a focus on advanced materials, nanotechnologies and biomaterials, can be perceived by universities as a competitor for the European and national funds. Collaboration with the EIT+ Research Centre is consequently weak, even if the main HEIs are stakeholders in the initiative. The lack of continuity and insufficient internalisation of collaboration could be remedied by the national government defining a framework for co-operation, using, for example, Stockholm's Science City Foundation as a benchmark.

The national government is placing greater emphasis on innovation policy, but Lower Silesia still lacks a comprehensive innovation plan. Cross-border development and international expansion are two areas that have been overlooked by policy makers and call for more careful and proactive treatment.

In the wake of Poland's science reform "Building on Knowledge" and the higher education reform "Partnership for Knowledge" the institutional changes of the national system have been introduced. The science budget has increased substantially and also the innovation policy mix has improved. Wroclaw and Lower Silesia elaborated a development strategy for the period 2007-2013 within the framework of the European structural funds exercise. While the strategy identifies a number of weaknesses, including the lack of R&D investment, the low share of innovative SMEs and the excessive focus on technology imports in innovation spending, it fails to acknowledge and define the role of higher education in the RIS.

Poland and Wroclaw are well placed to benefit from the European Structural Funds, but need to mobilise universities for regional development. The *ex-ante* conditions for the European Structural Funds 2014-20 programming period require national/regional innovation strategies for smart specialisation that will serve as a place-based economic transformation agenda. In Lower Silesia, this requires a thorough analysis of

regional comparative advantages, clearly defined measurable objectives and defining the role of the higher education sector in regional development.

Wroclaw's universities are slowly opening towards internationalisation of research and development, but without a clear sense of direction and a lack of targeting the neighbouring regions in the Czech Republic and Germany. Since Wroclaw's universities lack an international research strategy, they are not very active or successful in capturing FP7 funds and ROP innovation money. Repercussions for Wroclaw related to INTERREG programmes are also scant. The city of Wroclaw has mobilised its research arm, the EIT+ Research Centre, to establish links with international academia. EIT+ also aims to participate more actively in the development of the Dresden-Prague-Wroclaw triangle. The INTERREG IV C programme co-finances a number of projects in fields such as technology parks, energy efficiency and urban development, but these small scale projects do not involve the Czech regions.

National and local governments could more actively encourage international and cross-border collaboration involving universities. In the field of innovation, this could take the form of incentives to encourage more active participation in EU DG research programmes. It would also be useful to review Poland's bilateral agreements with relevant countries to see how these benefit Lower Silesia and Wroclaw and to what extent local universities are involved in these collaborations. Connecting SMEs to international co-operation programmes should be actively pursued.

At the local level, two paths of action could be adopted to improve the internationalisation of Wroclaw's RDI efforts. First, co-operation with neighbouring regions should be a stepped up, better organised and more targeted. Second, the experience of the EIT+ programme's regional trans-border co-operation and agreements should be used as a springboard for inter-regional co-operation between universities. The Oresund cross-border collaboration between Sweden and Denmark could serve as a source of inspiration for developing the governance of inter-regional associations and committees.

Wroclaw and Poland have a limited tradition of evaluating RDI projects. More efforts should be made to develop a robust evaluation culture.

The lack a robust evaluation culture in Poland and Wroclaw makes it difficult to get feedback on projects, to monitor them and to improve their management. When building a more robust evaluation culture, much could be learned from the leading European countries whose evaluation of

technology transfer schemes or networks includes the number of business ideas screened, the number of development products generated and complementary initiatives. In robust evaluation systems, the indicators for university start ups, incubators and science parks include the capacity to set up large partnerships and to access private funds, which are expected to take over public funds after a few years, while the number of universities involved, and of firms and jobs created, are important elements of success. More sophisticated analyses also include questionnaires addressed to customers or cost benefit analysis of programmes.

The development of a robust evaluation culture is important given Wroclaw's capacity to attract significant flows of public funding and the tendency of universities and the public agencies supporting RDI to measure their success in terms of acquisition of external funding. The risk is that the ability to attract public funding for an idea becomes the measure of success, rather than market success, which indicates the creation of products that people want to purchase and the amount of commercial return. The risks also include funding initiatives that are weakly aligned with the regional needs and innovations that are commercially not viable without subsidies.

Lower Silesia and Wroclaw need to lift up their innovation profile to close the gap with their competitors in Western Europe. In the "race towards the top", universities have a major role to play. This calls for stronger collaboration, co-ordinated and coherent initiatives in RDI and a strong regional innovation strategy.

Lower Silesia and Wroclaw need to lift up their innovation profile to close the gap with their competitors in Western Europe. In the "race towards the top", universities have a major role to play, not only as R&D providers, but also as agents of regional economic growth, by leveraging the regional potential, harnessing local talent and knowledge, and activating networks of stakeholders. Wroclaw's universities have the capacity to enhance their consultancy offer, leverage knowledge from technology transfer and from marketing project outcomes, manage incubators and science parks, and establish public-private partnerships with large companies. This is particularly important in Poland and Wroclaw, where a dominant share of the R&D is performed by the universities. Due to scattered initiatives and fragmentation of institutions and research, changes have been slow to materialise.

National, regional and local authorities can help catalyse these changes, providing that they adopt clear policy orientations and implement a coherent

set of policy initiatives. Lower Silesia and Wroclaw have been lacking a well-designed, articulated and comprehensive evidence-based innovation strategy that stresses the role of the higher education sector. This calls for prioritisation of a limited number of activities and segments of supply chains where Wroclaw and Lower Silesia have relative comparative advantage. It also calls for the development of a clear vision with measurable goals, milestones and metrics to determine whether the goals have been reached or not.

The following recommendations would promote regional innovation in Wroclaw and Lower Silesia:

Recommendations for national and local policy

- (City and the *voivodship) Develop comprehensive, well-articulated and designed, evidence-based innovation strategies that clearly stress the role of the higher education sector as crucial in leveraging regional potential, harnessing local talent and knowledge and activating networks of stakeholders.* Focus attention on the contribution of universities to entrepreneurship, their capacities to provide services (consulting, transfer of technologies, placing), to develop efficient innovation infrastructure (incubators, science parks) and to increase their participation in seed capital funds and public-private partnerships. Prioritise a limited number of activities and segments of supply chains where the city and the region have relative comparative advantage, and make efforts to model the "ask" and "bid" market (Box 3.2). Build a vision for the future, set (measurable) goals and milestones, and establish a metric that will identify whether these goals are reached.

- *(*National government and the *voivodship) Strengthen collaborative research, develop the HEI business forum function and foster cluster-related policies.* University-industry co-operation (UIC) in research is an important vector of innovation and growth, and one of the avenues to foster a dynamic research sector while strengthening the "third mission" of universities. Poland's share of UIC contracts in total FP6 contracts with Polish partners is 30%, i.e. smaller than that of the Czech Republic (42%) or Germany (38%). To enhance market-oriented, innovation-based R&D investment in Poland and Wroclaw, consider granting special advantages or incentives to collaborative research projects. Promote universities' "forum function" by providing a guide about experiences that have been developed in other countries, such as helping to select animators in

the clusters specifically in charge of the university/cluster interaction.

- *(*National government and the *voivodship) Link into appropriate European innovation support machinery, including Euro region and cross-border projects.* In collaboration with the universities, develop a robust internationalisation strategy for the university sector that embraces research, education and service in order to help capture FP7 funds and ROP innovation money. As the first step, prioritise co-operation with neighbouring regions by co-ordinating joint university efforts, building on the experience of the EIT+ programme which has strengthened regional trans-border co-operation and collaboration with the regional partners in Poland. Draw on world class examples of cross-border collaboration, such as the Oresund Science Region (see Box 3.3), notably in terms of governance arrangements (creation of interregional committees etc.).

- *(National government and the voivodship) Promote more a market-oriented business model of the technology transfer offices* and improve research project management and marketing. Improve the business model of technology transfer offices to make them more efficient and responsive to market requirements. Ensure (national and local governments) that sufficient assistance goes to the modernisation of Technology Transfer Offices in order to secure the recruitment of individuals with market experience and industry background.

- *(*The city and the *voivodship) Review and systematise collaboration among HEIs and boundary-spanning collaboration between research departments.* Upgrade the governance of the regional innovation system. Define frameworks for co-operation among HEIs, and between HEIs and key stakeholders that could remedy the lack of continuity and insufficient internalisation of collaboration, drawing on successful examples such as the Science City Foundation in Stockholm.

- (Government at all levels) *Promote a more robust culture of evaluation of RDI.* Learning from the well-developed evaluation practises of Germany, Finland, Sweden, the UK or the US, launch a general evaluation programme assessing the Polish innovation policy and build a methodology that could help regional authorities to evaluate their own initiatives. Consider launching a pilot project in Lower Silesia.

- (City and national government) *Seek to encourage greater collaboration between universities through programmes, joint investments in R&D facilities and incentives*. Encourage university specialisation and promote international, national and regional networking.

- (City and the voivodship) *Clarify the roles of different institutions* (e.g. the Wroclaw Agglomeration Development Agency, EIT+, Wroclaw Technology Park, Lower Silesian Innovation Park and university-based technology transfer organisations and incubators) in the Wroclaw and Lower Silesia regional innovation system.

- (National government*) In collaboration with universities, construct an overall monitoring and evaluation system that could cover a wide range of regional development issues with a special focus on innovation-relevant activities.* This should be supported by a coherent and informative system of indicators for the measurement of the regional contribution of universities. The system should be able to collect information at the organisational level, the university level and the regional level. Collaborate with the regional and local government and universities to improve the evidence basis for regional and institutional decision making through the collection, monitoring and analysis of robust data. Define common university indicators, guarantee transparency of results, strengthen monitoring and follow up the success of the programmes and improve the public dissemination of results.

- *(National government) To improve productivity and innovation in traditional industry and services, align the ongoing programmes of the national, regional and local governments with the region's needs and establish special mobility programmes to link students, graduates, post-graduates and academic staff with local businesses and industry in a more systematic way.* Models for linking postgraduate students with local industry include the Knowledge Transfer Partnership Scheme in the United Kingdom, which has improved the competitiveness of companies through the introduction of some form of innovation or new technology; around 75% of postgraduate associates are offered jobs in the companies.

- *(National government) Review the state of collaboration in the university sector to provide an opportunity for universities to rethink their priorities and to specialise.*

Recommendations to universities

- Develop a more comprehensive, differentiated view of the university's role in the local economy instead of one-size-fits-all approach to technology transfer. Develop the "forum function for industry" by organising conversations with local industries in meetings, conferences, industrial liaison programmes, standards forums, entrepreneur/investor forums, visiting committee discussions of departmental curricula, taking advantage of the co-ordination structures or member associations of existing clusters. Perceive creation of better jobs as the focus of innovation activities. Ensure that Technology Transfer Offices assume a wider role in collaboration with industry and fully play their role in cementing the value chain, strengthen them with professional staff.
- Align RDI activities to address the needs and demands of the existing and emerging local clusters, industries and a wider society. Develop a practical engagement with business and a collaborative way of referring enquiries from businesses and industry with the help of virtual and face-to-face collaboration.
- Develop an institutional strategy to internationalise research, development and innovation and to access a larger share of FP7 funds and ROP innovation money. Systematically strengthen international collaboration to improve RDI outcomes, building on the connections driven by individual academics and EIT+.

Towards creative economy and social cohesion

The city of Wroclaw has identified creativity and culture as central elements of its social and economic development strategy. It seeks to use the status of European Capital of Culture 2016 to achieve a step forward in its urban development trajectory and now needs to mobilise university resources to support this goal.

Mobilising university resources for the European Capital of Culture will help build a strong global brand for Wroclaw as a centre of culture and innovation in the crossroads of Germany, Poland and the Czech Republic. It will help develop the knowledge and skill base in the regional economy and attract and retain young creative workers and students to the region. For this to happen, the expertise in the arts and cultural field and community engagement needs to be pooled from a range of disciplines, universities and art academies to work with the public authorities, business and industry and civil society. This will require action in four fields: tourism, creative industries, social cohesion, and urban regeneration and space management.

The European Capital of Culture 2016 requires a long-term growth strategy for the tourism industry that can guide a comprehensive approach to skills development.

The challenges associated with the European Capital of Culture 2016 include effective policies and actions to maximise the positive impacts of tourism and its linkages with the emerging creative economy and higher education institutions. The city of Wroclaw and the wider region would benefit from a long-term growth strategy for the tourism industry that responds to the needs of the Capital of Culture and also long-term trends in tourism. Such a strategy should be designed in partnership with other levels of government, educational organisations, public and private sector employers and trade unions, and should guide a comprehensive approach to skills and competence development. Aligning education and training provision with industry needs requires a revision of curricula to include entrepreneurship skills, up-skilling of educators, work-based and experiential learning opportunities, linkages and pathways between vocational training and higher education, and new delivery models with

greater flexibility for lifelong learning. Joint efforts are needed to ensure that Wroclaw's SMEs are able to capture a greater share of tourists' expenditures and that the local population will be able to participate and co-produce the diverse cultural offer. The city of Wroclaw, in collaboration with the art academies and universities, could help develop a stronger base of creative businesses that are able to supply a sufficient quantity of quality goods and services to respond to the demand from the cultural tourism sector.

The European Capital of Culture can boost Wroclaw's transformation to a Silicon Valley of Eastern Europe with a strong creative arts and media sector. This calls for university-industry collaboration, formal and non-formal training, and supporting a demand pull for creativity and innovation in SMEs.

As part of Wroclaw's ambition to become the Silicon Valley of Eastern Europe, efforts are being made to tap into the entrepreneurship and innovation potential of the creative arts and media, which are now more accessible to young people thanks to digital technologies. Wroclaw's rapidly growing gaming industry could provide a basis for the emerging cultural and creative industries, but is struggling to find skilled labour. At the same time, a large part of Lower Silesia's more traditional SMEs have limited exposure to digital technologies. To respond to the needs of the emerging industry, the city of Wroclaw has supported the launch of the Design Accelerator and a multimedia hub Creativro, as well transversal skills development through a small scale multidisciplinary higher education partnership.

Moving forward, Wroclaw could launch the Wroclaw Cultural and Creative Industries Forum, which could create a shared understanding of the potential of the cultural and creative industries to identify mutual interests and benefits and to design a strategy and an action plan to move forward. This could help introduce interdisciplinary groups and alliances between design and technology to develop links between arts-based education/research and technological education, or between arts-based education/research and the natural sciences. In order to build a strong future for the creative industries, Wroclaw could develop a creative curriculum and programming for schools and centres outside of the formal education sector. The Nerve Centre in Derry, Northern Ireland, could serve as an inspiration, given its long experience in the design and delivery of digital community relations resources for use in formal and non-formal learning. Finally, injecting innovation and creativity in the traditional SME sector could be achieved by encouraging SMEs to work innovatively with creative

companies. The UK business-to-business (B2B) voucher scheme Creative Credits could serve as an example.

Wroclaw wants to use arts and culture to improve social cohesion and urban regeneration. Universities and art academies can promote this by creating a multi-pronged strategy to engage with the community and by joining forces in community development.

Wroclaw's rapid socio-economic development has contributed to growing disparities within the city and the wider region as well as between social groups. The city and its regional stakeholders see arts and culture as a tool to facilitate social cohesion, urban regeneration and regional development that can make Wroclaw and Lower Silesia more attractive to work and live in. Wroclaw's higher education institutions could support these goals by developing a multi-pronged strategy to engage with the community, ranging from widening access and youth empowerment to active performance programmes for the wider audience. By becoming more central to Wroclaw's economic, social and cultural life, universities and art academies can actively help to expand their audience and customer base, audiences for music, theatre and opera, purchasers of artefacts, and sponsors for arts productions and the institutions. Universities, art academies, the city of Wroclaw, the regional government and the industry sector could join forces to develop mechanisms to improve relevance of education through closer labour market linkages that nurture the cultural and creative talent of the regional population, attract creative talent from outside of the region and turn new ideas into cultural and social enterprises.

Wroclaw could also consider making efforts to transform emerging local community centres into creative community hubs in order to pool and mobilise the emerging academic expertise in community development that is currently spread across different departments and institutions. To pursue an economic development strategy that is both creativity-based and socially inclusive, Wroclaw and Lower Silesia could launch pilot projects in a few communities, such as Nadodrze, to leverage local resources. The creative community hub approach would capitalise on the existing organisations and knowledge of community issues and conditions, allowing programmes to be developed and adapted to individual neighbourhoods' specific needs and talents. The Point Community Development Corporation in New York City and Creative London's Hub Strategy address the needs of economically and socially disadvantaged communities and can serve as inspiration.

Universities and art academies are physical assets for Wroclaw's creative knowledge economy. There is need for greater collaboration in space management and a long-term strategy to address the design, proliferation and duplication of higher education facilities.

As a city that aspires to become a creative knowledge metropolis, Wroclaw will need a range of facilities that support collaboration, encourage knowledge exchange, attract talent and contribute to social cohesion in the community. While Wroclaw's universities and art academies have important physical assets that make a contribution to civil society, there is no shared vision between the universities and the city for the future strategic management of the physical assets in the broader urban context. Access to the EU funding and the backlog of modernisation work have contributed to a higher education building boom with potentially unsustainable outcomes when institutions are constructing new buildings for similar functions in close proximity to each other. Spatial environment of a fragmented set of learning environments does not sufficiently support creativity and knowledge exchange. Many departments or faculties are housed in heritage buildings that are expensive to maintain, need continuous maintenance and lack flexibility because of legal restrictions.

One way to move forward is to extend Wroclaw's physical regeneration strategy to universities. Wroclaw has embarked on a long term regeneration strategy to exploit its assets of historical buildings under the motto "Wroclaw - the meeting place" through which the city seeks to draw attention to its historic role as the place of interchange for goods and ideas. Wroclaw's physical planning department has the responsibility for the urban regeneration strategy and could better take into consideration the universities that have buildings or zones in the regeneration area. Local plans could focus on developing a "cultural quarter" that could engage not only the university estates departments, but also the arts and humanities departments as well as art academies, in the same way that WTC and the Pracze Science Park link with science and engineering.

Finally, creating a long-term strategic plan that is relevant to creativity, learning, research, business and society and seeks to bring together academia, industry and the general public, could serve as a basis for redefining how the physical environment of the city of Wroclaw will support the diverse needs.

The following recommendations would promote the move towards a creative economy and social cohesion:

Recommendations for the national government

- Develop Poland's creative economy by promoting targeted action plans at all levels, from the community to the cities to the national level. Reconcile the national cultural and social objectives with instruments of education, trade, technology and tourism.

Recommendations for the local and regional governments

- Support cultural and creative industries. In collaboration with universities and other educational institutions and the public and private sector, increase efforts to support creative and entrepreneurial skills among students and graduates and provide better further education opportunities. To provide a robust knowledge base for the Wroclaw creative economy, support multidisciplinary collaboration across the higher education sector and different institutions by encouraging the establishment of joint institutes, departments and institutions. In collaboration with the Wroclaw universities, sponsor an observatory on the creative sector. Establish a Cultural and Creative Industries Forum to bring together the arts academies and key stakeholders to further develop this sector, and provide a vehicle for common purpose.
- In order to embed the European Capital of Culture within the fabric of the city and region, and to use the arts as a vehicle for regeneration and social cohesion, support the development an active engagement programme that involves the universities, arts academies and the community, building on and celebrating traditional skills and broadening participation in and appreciation of contemporary arts. In collaboration with the Fine Art Academy, explore developing craft as a vehicle for widening participation by building on and celebrating traditional skills.
- Build a strong global brand for Wroclaw as a centre of culture and innovation in the crossroads of Germany, Poland and the Czech Republic, to develop the knowledge base in the regional economy and to attract young creative workers and students to the region.
- To realise the full potential of Wroclaw's creative enterprise, provide specialised entrepreneurship support and business skill development for cultural and creative industries; expand existing

small business and entrepreneurship programmes to provide specialised support for creative industries; develop sector support initiatives to serve creative industries more effectively; consider Creative Credit type voucher schemes to inject innovation and creativity into the traditional SME sector; create vehicles for sales development, business-to-business forums for investment and business matching to support the creative industries sector; and provide incubation space and services for creative businesses, including space to conduct business, access to shared prototyping equipment, workshops and courses on business planning and marketing, and access to potential investors.

- In collaboration with universities and art academies, undertake a review of the social and economic implications of/and opportunities offered by the cultural and creative industries in Wroclaw and Lower Silesia. This should include a review of the academic direction of arts education in light of international experience and the socio-economic strategy for local and regional development. The review should identify new educational pathways and career opportunities for "cultural workers". It should:

  - consider the structure of arts/media education, and establish clear articulation routes from secondary and post-secondary education to higher education – embracing the full breadth of ISCED 5A, 5B and 6 provision with attention to access, accreditation and credit transfer between the arts institutions, but also in partnership with the other universities in Wroclaw.

  - examine training and retraining provision in order to make available new and/or alternative career pathways.

  - identify the current and future opportunities offered by the emerging cultural and creative industries and the labour market, e.g. for cultural workers in micro-business, homework, freelance/casual, arts organisations; determine what level of skill or knowledge will be required in the future and what are the implications for the arts in terms of education, institutional organisation, pedagogy, curriculum, research, training and engagement.

- In partnership with other levels of governments, educational institutions, public and private sector employers, and trade unions, develop a long-term growth strategy for the tourism industry that responds to the needs of the Capital of Culture and also the megatrends in tourism, and guides a comprehensive approach to skills development. The outcome should be the alignment of

industry needs with detailed competency development in education. Bridging the gap between the education provision and industry needs requires revision of curricula, including entrepreneurship skills, up-skilling of educators, work-based and experiential learning opportunities, linkages and pathways between vocational training and higher education, and the provision of new delivery models with greater flexibility, especially for lifelong learning and up-skilling of workers.

- Connect university research to the community by supporting challenge-driven research through competitive calls. In order to make the connection between the current research focus and community engagement, "translational research" could be adapted to address the critical issues in Wroclaw and Lower Silesia. In addition, university leaders could develop initiatives supported by small research grants to encourage faculty to undertake research activities that connect with community agendas.

- Transform emerging local community centres into creative learning centres and community hubs to pool and mobilise the emerging academic expertise in community engagement that is spread across different departments and institutions. Linking creative community programming to local economic development and revitalisation of at-risk neighbourhoods through co-production in which the local community is engaged in the development and implementation of projects. Launch pilot projects in communities such as Nadodrze and the suburbs to leverage local resources, capitalising on the existing organisations and knowledge of community issues and conditions.

- Extend Wroclaw's regeneration strategy to universities and art academies by developing a "cultural quarter". Promote greater collaboration in space management and a collaborative long-term strategy for Wroclaw's physical environment that is relevant to creativity, learning, research, business and society. In collaboration with the higher education institutions, develop a city-wide strategic plan for the coherent development of facilities for learning and research that supports the needs of individual universities and the business and community, and creates a connected, city-wide learning environment. To achieve this: develop a shared vision with the range of stakeholders; map the current uses of buildings and public spaces across the city, landmarks, and vistas and the transport infrastructure; design alternative scenarios for development; select a scenario that meets the needs and expectations of the stakeholders; and create a strategic framework that identifies the mix of different

environments and uses, a coherent transport infrastructure, the massing and character of the city, a time frame for overall development and transition, and public and private investment needed.

Recommendations for arts academies and universities

- Review the curriculum and develop RDI capacity and capability of the art academies in order to modernise and enhance their academic mission and labour market relevance in the context of international developments in collaboration with the representative bodies for creative arts and media education.
- Develop interdisciplinary and practice-led research capacity and capability in order to strengthen the academic and international profile of the art academies and to open up new opportunities for graduates, as the creative and cultural industries are knowledge-intensive sectors.
- Contribute to the social and cultural inclusion of the local and regional population through university arts and humanities programmes that include creative contributions by various population groups.
- Contribute to the development of the local and regional creative economy by developing and expanding multi-disciplinary programmes and programmes in entrepreneurship and non-profit management, both in formal degree programmes and through outreach efforts.
- Develop university knowledge and technology transfer programmes to focus on the potential for development of productivity enhancing product and process innovations in cultural and creative fields in Wroclaw and the wider region, particularly in design.

Chapter 1.
Wroclaw's higher education in context

This chapter outlines key features of Lower Silesia and Wroclaw in terms of demographic development, economy and labour market, and highlights the achievements and challenges of Polish higher education system. In the field of education, the main challenge for Poland has been to modernise the education system inherited from the communist regime and at the same time address the increasing demand from students and their families for higher education. Consecutive governments have introduced many initiatives in higher education to reach this objective. This chapter discusses the results of these initiatives and remaining challenges in the current higher education system. The most recent reform of higher education was adopted in 2011 and is currently being implemented. This chapter discusses the new reform and describes its potential impact.

1.1 Lower Silesia and Wroclaw

Geography and demographic development

Wroclaw is the capital of the Lower Silesia *voivodeship/*region (*Dolnośląskie*), located in the heart of Central Europe, next to the border with Germany and Check Republic. Wroclaw is a city with *powiat* status. Lower Silesia is composed of 29 *powiats*, including 3 cities with the status of *powiat* (Central Statistical Office, 2011a) (cities with the *powiat* status are indicated in darker tones in the picture below).

Figure 1.1. Map of Poland with Lower Silesia highlighted



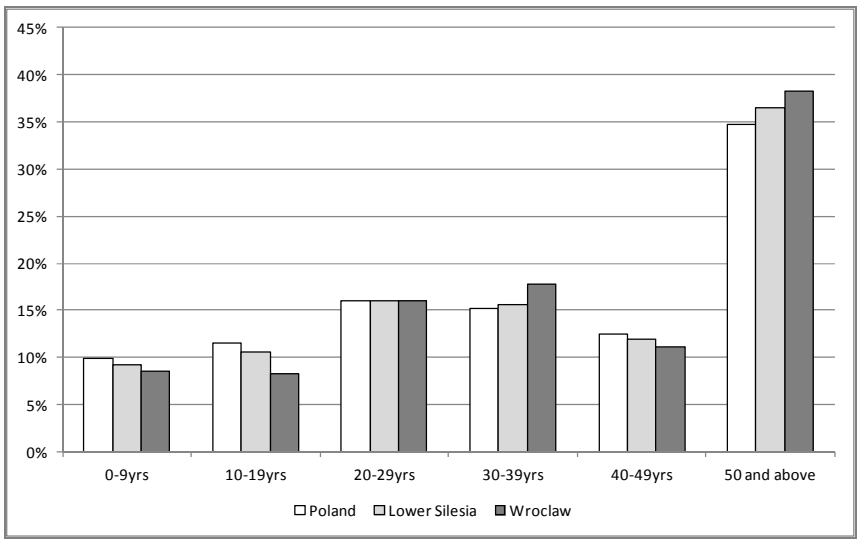
Source: Invest in Poland (2012), Investment Incentives in SEZ, *www.paiz.gov.pl/investment_support/investment_incentives_in_SEZ,* accessed 1 October 2012.

In 2010, Lower Silesia had a population of 2.88 million and was the fifth most populated *voivodeship*/region in Poland. The city of Wroclaw with the population of 633 000 is the biggest city in the *voivodeship*/region.

Population of Lower Silesia and the city of Wroclaw is aging. The ratio of younger (0-20 year-olds) to older (above 50) cohorts indicates that ageing of the population might be more pronounced in the Lower Silesia region than in the whole country (see Figure 1.2).

Lower Silesia faces a challenge of uneven development, with rapid population growth in Wroclaw and the rest of the region shrinking. While the population in the area of Wroclaw increased, the population of Lower Silesia shrank between 2005 and 2010. The trend observed in the region might be further reinforced by the negative natural increase in the region, meaning that the number of death outweighs the number of births, and the negative international migration. Conversely, the negative demographic changes might be to some extent offset by a positive net internal migration (Central Statistical Office, 2011a).

Figure 1.2. Age structure in Poland, Lower Silesia and Wroclaw (2010)



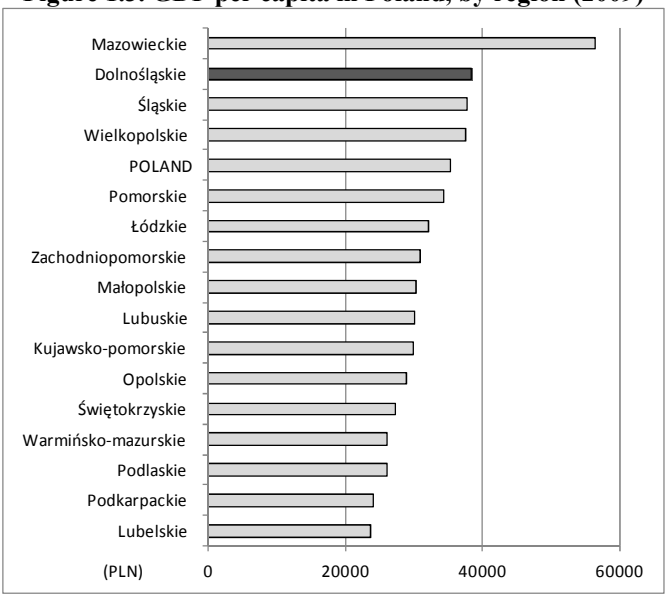
Source: Central Statistical Office (Główny Urząd Statystyczny) (2012), "Information on the population balance for 2011," Local Data Bank, *www.stat.gov.pl/bdlen/app/strona.html?p_name=indeks.*

Economic situation

In the Polish context, Lower Silesia is characterised by the size of its economy, the weight of its industrial sector and the growing importance of the service sector. Lower Silesia is among the top four regions of Poland in terms of regional gross value added (GVA). The share of industry in the generation of GVA is estimated at 32.9%, which is the highest in the country and well above the national average (24%). Service sector entities generate almost three-fifths of regional GVA.

Lower Silesia is a relatively wealthy region of Poland. In 2009, its GDP per capita was above the Polish average and the second highest among the regions, right after the region of Mazowieckie (see Figure 1.3). In the same year, 8.2% of the country's GDP was produced in Lower Silesia. An average individual's income (gross disposable income) in Lower Silesia was higher than the average income in 12 other regions and higher than the average national income. Wealth, however, tends to be distributed unequally. For example, GDP per capita in the city of Wroclaw was nearly twice as high as in poorer parts of the region (Central Statistical Office, 2011b). In 2008, 17% of people lived below the relative poverty line in Lower Silesia, slightly less than the national average.

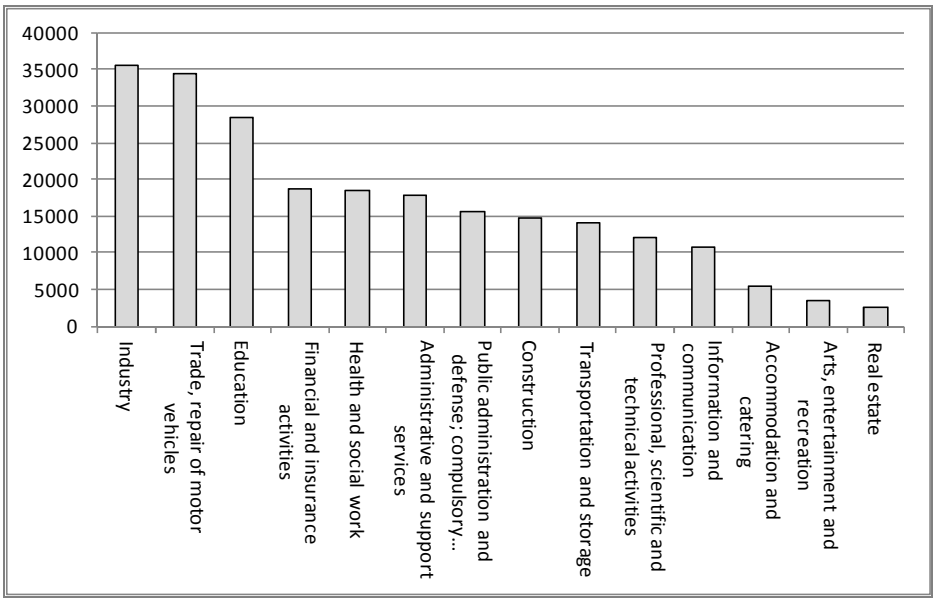
Figure 1.3. GDP per capita in Poland, by region (2009)



Source: Central Statistical Office (Główny Urząd Statystyczny) (2011c), *Produkt krajowy brutto – Rachunki regionalne w 2009 r* (Higher Education Institutions and their Finances In 2010)., Central Statistical Offical (Główny Urząd Statystyczny), Warsaw.

In Lower Silesia, a third of the gross value added was produced by the industry sector, more than the share of the industry sector in the national value added. Many industrial activities are related to the extraction of natural resources such as coal and copper. Conversely, the agriculture sector is relatively less important in Lower Silesia than in other regions in Poland (Central Statistical Office, 2011c); Lower Silesia is the most urbanised region of Poland. In the city of Wroclaw, in 2008, 77% of its gross value added was created by services including: trade and repair, hotels and restaurants, transport, storage and communication, financial intermediation, real estate, renting and business activities and other services (Statistical Office in Wroclaw, 2011). Employment distribution by type of activity in the city is shown in the Figure 1.4.

Figure 1.4. Employment by sector in Wroclaw (2010)



Source: Statistical Office in Wroclaw (Urząd Statystyczny we Wrocławiu) (2011), *Wroclaw In Figures: Living Conditions of the Population of Wroclaw*, Statistical Office in Wroclaw (Urząd Statystyczny we Wrocławiu), Wrocław.

Lower Silesia is one of the most attractive regions in Poland in terms of investment (PwC, 2011; Nowicki *et al*., 2011). In 2010, 9% of Polish foreign direct investment (FDI) was located in Lower Silesia, more than in any other region except for Mazowieckie. This good investment environment is due to the geographical location of Lower Silesia, bordering

Germany and the Czech Republic, well-developed transport networks with good connections to Western Europe, a strong R&D sector, policies favourable to business, and a good social infrastructure. At the same time, Lower Silesia's attractiveness is damaged by a high crime level and low crime clearance rate, which makes Lower Silesia the second most dangerous region in the country (Nowicki *et al.*, 2011).

The city of Wroclaw and its surroundings contribute greatly to the attractiveness of the region. Over the last years (2006-2010) Wroclaw recorded the highest economic growth (measured with GDP growth per capita, real wages and change in unemployment rate) among major Polish cities (PwC, 2011). But other sub-regions such as Wałbrzyski and Jeleniogórski are also relatively well rated in terms of investment attractiveness (Nowicki *et al*., 2011). This is related among others to the fact that three out of 14 special economic zones in Poland are located in Lower Silesia, outside the sub-region of Wroclaw (Polish Information and Foreign Investment Agency, 2012).

Labour market

Compared to international figures, Lower Silesia and Poland have similarly low shares of their population in the active labour force. Overall, 54% of the population of the region was active in the labour force in 2010, one percentage point less than the national rate. The difference between the national and regional percentage reflects the higher proportion of people of retirement age in Lower Silesia than in the whole country. By international standards, labour force participation in Poland and Lower Silesia is low; only six out of 34 OECD countries have lower share of active population than Poland. Employment rate in Lower Silesia was 1.5 percentage points below the national average. No difference was observed in the employment rate of men and women (Central Statistical Office, 2012). However, women in Lower Silesia were more likely to be inactive, similar to national and international trends.

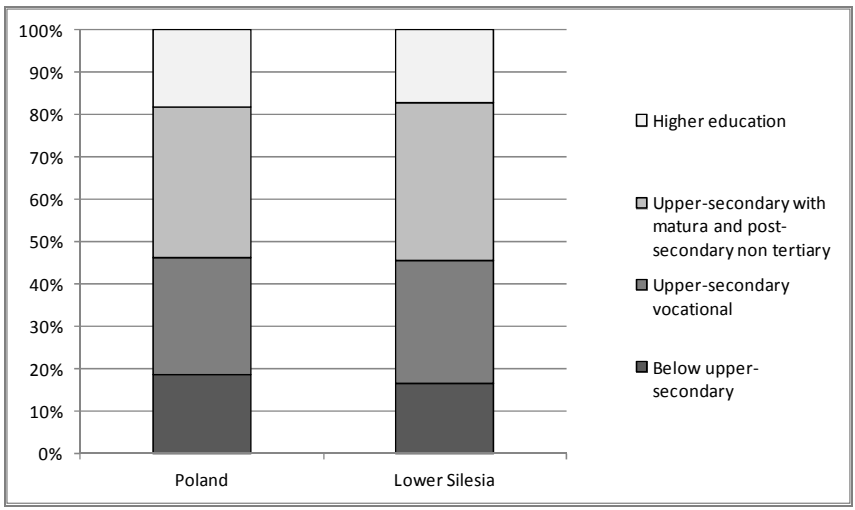
There are wide differences in access and participation in the labour market in Lower Silesia, with Wroclaw representing the lowest overall unemployment rate, which is nevertheless relatively high for higher education graduates. Typically, large metropolitan areas with convenient transport connections are less affected by unemployment (Observatory of Lower Silesian Labor and Education Market, 2011). In 2011, the unemployment rate ranged from 5.3% in the area of Wroclaw to more than 25% in *powiats* with the highest unemployment rate in the region (Wroclaw's Regional Steering Committee, 2011). Inactivity was slightly higher among those employed in the agricultural sector, and thus in areas

specialising in agriculture (Observatory of Lower Silesian Labor and Education Market, 2011). In the city of Wroclaw, 28% of those unemployed had completed higher education and 26% upper-secondary education (Statistical Office in Wroclaw, 2011).

Education

In 2009, two-third of individuals (15-64 years old) in Lower Silesia had upper-secondary education, 17% held a higher education diploma and 16% had education below upper-secondary. The share of population with higher education in the region was below the national average (see Figure 1.5), but has been steadily rising over time; it increased by 2 percentage points between 2006 and 2009 (Ministry of Regional Development, 2010). In this context, the city of Wroclaw, with one person in five holding a higher education diploma, stands out as a place with a highly-educated population (Ministry of Regional Development, 2010; PwC, 2011).

Figure 1.5. Education of population (ages 15-64) in Poland and Lower Silesia (2009)



Source: Ministry of Regional Development (Ministerstwo Rozwoju Regionalnego) (2010), *Analiza Sytuacji Społeczno-Gospodarczej w Województwie Dolnośląskim,* Ministry of Regional Development (Ministerstwo Rozwoju Regionalnego), Warsaw.

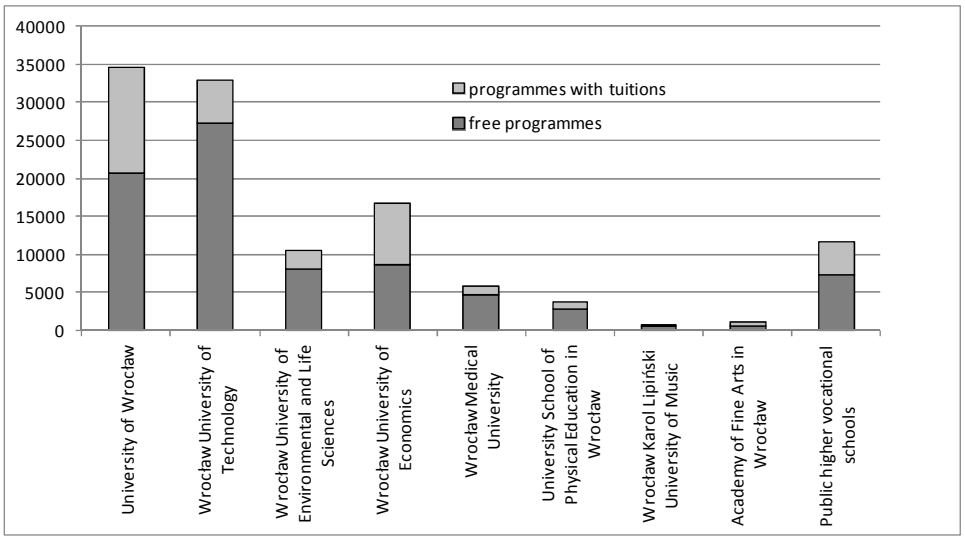
The city of Wroclaw has a high ratio (22%) of students to the entire population; it is also the main university centre in the region and one of the most important in the country. Wroclaw caters to 86% of students in the

region and students from Wroclaw represent 8% of the total student population in the country (Statistical Office in Wroclaw, 2011; Central Statistical Office, 2011d).

Higher education institutions that enrol the largest number of students in the region are the University of Wroclaw (*Uniwersytet Wrocławski*) and the Wroclaw University of Technology (*Politechnika Wrocławska*) (see Figure 1.6). Together they cater to nearly 60% of students in public institutions in the region. The University of Wroclaw provides programmes in a wide range of fields, including social and hard sciences, while the Wroclaw University of Technology focuses mainly on hard and applied science. The budget of the University of Wroclaw and the Wroclaw University of Technology in 2010 was respectively PLN 366 million and PLN 532 million (Wroclaw University of Technology, 2012; University of Wroclaw, 2012). By Polish standards, revenues from research activities of the Wroclaw University of Technology are high. In 2010, they represented 27% of the university total revenues (Wroclaw University of Technology, 2012). In comparison, contribution of research to the total national higher education budget was 16%.

All public higher education institutions provide programmes with fees, but the proportion of students in these programmes varies. The University of Economics (*Uniwersytet Ekonomiczny we Wrocławiu*), the University of Fine Arts (*Akademia Sztuk Pięknych im. Eugeniusza Gepperta we Wrocławiu*), and the University of Wroclaw have more than 40% of students in programmes with fees. Conversely, the Karol Lipinski Academy of Music in Wroclaw (*Akademia Muzyczna im. Karola Lipińskiego we Wrocławiu*) and the Wroclaw University of Technology have the lowest proportion of students paying for their studies. Lower Silesia has four public vocational higher education institutions, all of which are located outside Wroclaw. This is in line with the national trend, as higher education institutions are typically situated outside main university cities in Poland. Lower Silesia's non-public higher education sector enrols 29% of the student population.

Figure 1.6. Students in public HE institutions in Lower Silesia (2010/2011)

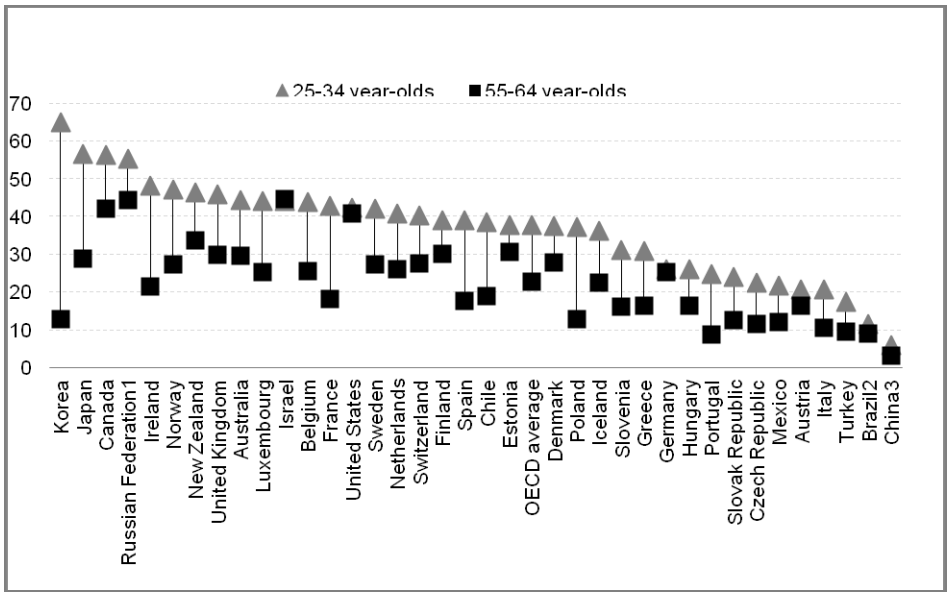


Source: Central Statistical Office (Główny Urząd Statystyczny) (2011d), *Szkoły wyższe i ich finanse w 2010 r* (Higher Education Institutions and their Finances in 2010), Central Statistical Office (Główny Urząd Statystyczny), Warsaw.

1.2 Higher education in Poland

Tertiary education attainment levels have rapidly grown in Poland in recent years and now reach the OECD average for younger age groups, whereas the older generation lags behind in international comparison. In 2010, 13% of the older working age population in Poland (aged 55-64) had a tertiary education degree compared to the OECD average of 23%. Whereas 37% of the population aged 25-34 had a tertiary education degree compared to the OECD average of 38% (See Figure 1.7). Postsecondary attainment rates have considerably improved among the younger Polish generation, which now has similar skills levels as their OECD peers and much higher than the older Polish population.

Figure 1.7. Percentage of population, by age group, that has attained at least tertiary education in selected countries (2010)



1. Countries are ranked in descending order of the percentage of 23-34 year-olds who have attained at least tertiary education. The year of reference for the Russian Federation is 2002, Brazil 2009 and China 2000.

2. For technical reasons, these figures use Israel's official statistics, which include data relating to the Golan Heights, East Jerusalem, and Israeli settlements in the West Bank.

Source: OECD (2012a), *Education at a Glance 2012: OECD Indicators*, OECD Publishing. doi: 10.1787/eag-2012-en.

Because of its association with higher skills, the steep increase in the enrolment in higher education (ISCED 5A level) in Poland from the 1990s is a positive development. In the academic year 2010-2011, the net higher education enrolment rate[1] was 40%, four times higher than 20 years earlier at the outset of political and economic transformation.

The quality of higher education is a challenge in Poland, as pointed out by national and international studies (E&Y, 2009; Fulton *et al*., 2007). There are two reasons. First, higher education builds on a system developed during the communist regime, which was relatively unsuccessful in conveying high skills to students[2]. The International Adult Literacy Survey shows that in the 1990s, higher education diploma holders (16-65 year-olds) in Poland performed on average less well than those with upper-secondary education in many other countries participating in the study, and even less well than

those who have not even obtained upper-secondary education in Germany and Sweden (OECD/Statistics Canada, 2000). Second, higher education institutions have weak incentives to improve the quality of their education and training. The national authorities have acknowledged the quality concerns; the main goal of the recent higher education reform has been to enhance the quality of education and training.

Recent reforms in the upper secondary system

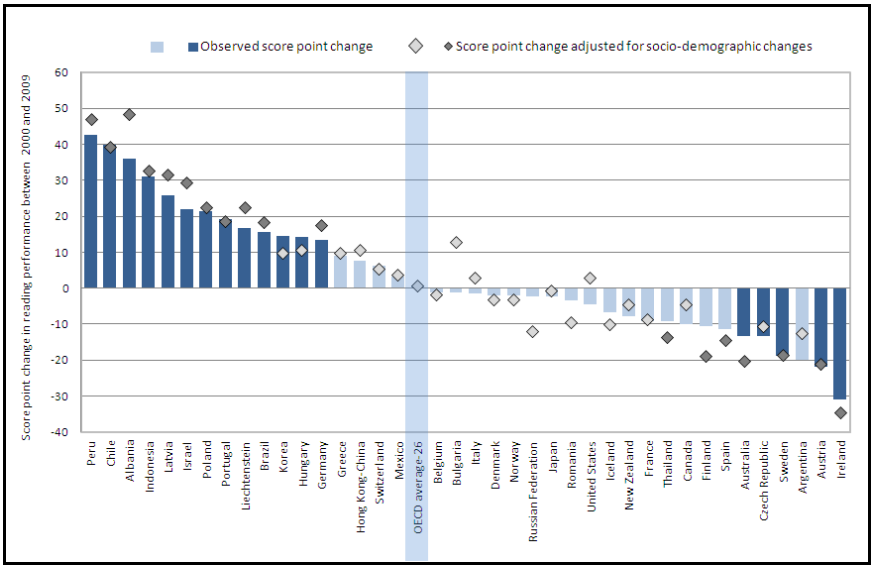
How prepared students are for higher education depends on the education they have previously received. From this point of view, reforms of the Polish school system have a significant impact on its higher education (see Annex 1.A.3 for a chart presenting the education system in Poland).

Learning outcomes at schools have improved because of the recent reform of the Polish school system. The most recent results of the Programme for International Student Assessment (PISA) show that young Poles perform slightly above the OECD average in reading and science and one point below the OECD average in mathematics. Polish results are also less spread out than in many OECD countries indicating smaller difference in student performance. In comparison with similar countries from the region such as Estonia, the Czech Republic, Hungary, Lithuania, Latvia, the Slovak Republic and Slovenia, Polish teenagers perform less well on all three scales than their peers in Estonia, and less well in mathematics and science than fifteen-year-olds in Slovenia. The average academic performance of upper-secondary students (fifteen-year-olds) has improved in Poland in the last ten years. The Figure 1.8 shows the change in the student performance in reading; similar trends can be observed in mathematics and science. Improvement in the performance of fifteen-year-olds is associated with a reform of the school system that extended comprehensive schooling by one year. A comparison of PISA results in 2000 (when sampled students were already tracked) and in 2003 and 2006 (when sampled students were still in a comprehensive school) shows that the average performance improved in all assessed areas after the implementation of the reform. The significant increase in the Polish performance on PISA assessments is explained by significantly better results of students in the lower tail of the performance distribution (Jakubowski *et al*., 2010).

At the end of their upper-secondary education students, in two upper-secondary tracks out of three, pass a standardised national exam (*matura*). Since 2010, mathematics has been an obligatory subject on the exam; previously, students were free not to choose it. This initiative may have increased the pool of candidates for studies in technical fields, but it is still

too early to evaluate the impact of this initiative. Passing the upper-secondary exam is necessary for transition to higher education. Institutions in high demand might, in addition, select students according to their marks.

Figure 1.8. PISA results in reading over time (2000-09)



Note: Observed score point differences that are statistically significant are in darker tones.

Source: OECD (2010b*), PISA 2009 Results: Learning Trends: Changes in Student Performance Since 2000 (Volume V),* PISA, OECD Publishing. doi: 10.1787/9789264091580-en.

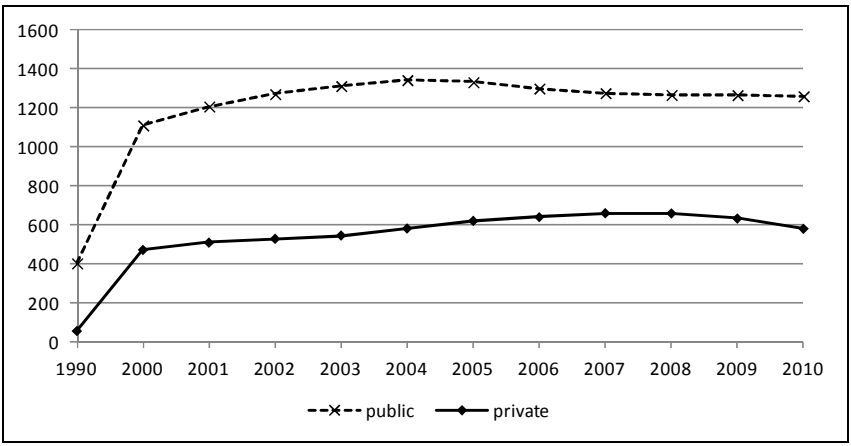
Non-public vs. public HE

In 2010-2011, Poland's 453 higher education institutions enrolled 1.8 million students, of which 60% were women.

In international comparison, Poland has a large non-public higher education sector with many small institutions that enrol one-third of higher education students. While the majority of higher education institutions are non-public, this sector caters to only around one-third of students, implying that non-public institutions tend to be smaller in size than public ones (Central Statistical Office, 2011d). By OECD standards, Poland has a large proportion of students in non-public institutions[3]; the relative enrolment in the private sector is higher only in Japan, Korea and Chile. As the figure

below shows, the creation and expansion of the non-public sector explains a large part of the rapid increase of higher education enrolment in Poland.

Figure 1.9. Number of students in HEIs in Poland (in thousands)



Source: Central Statistical Office (Główny Urząd Statystyczny) (2010*), Szkoły wyższe i ich finanse w 2009 r* (Higher Education Institutions and their Finances in 2009), Central Statistical Office (Główny Urząd Statystyczny), Warsaw.

Poland's non-public higher education operates according to different rules than the public sector, as shown in the table below (2010-2011 is the reference year for the statistical information). This may raise concerns about equity in higher education and can have an impact on the overall quality of provided education, as discussed in other parts of this chapter. The number of students in programmes with fees depends on the demand from students. The only constraint for public institutions is that the number of students paying fees cannot exceed the number of those studying for free in similar programmes.

Table 1.1. Public and non-public HEIs in Poland

	Public	Non-public
1) Who owns the institution?	State	Non-public entity
2) What are the sources of funding?	78.5% of the total revenue comes from teaching and 15.9% from research activities. Teaching activities are funded 72% from public funds and 17.4% from tuition fees.	90.2% of the total revue comes from teaching and 2.8% from research. 86.6% of teaching activities are funded with tuition fees.
3) In which form are programmes provided?	67% of students attended full-time programmes with **no tuition fees**, 33% were in part-time programmes **with tuition fees**.	17% of all students studied full-time. All students pay **tuition fees**.

Source: Ministry of Science and Higher Education (2005*), "Ustawa z dnia 25 lipca r. 2005 Prawo o szkolnictwie wyższym,*" (Act of 25 July 2005 Law on Higher Education) Ministry of Science and Higher Education, *www.nauka.gov.pl/fileadmin/user_upload/szkolnictwo/Reforma/20110523_USTAWA_z_dnia_27_lipca_2005.pdf.*; Ernst & Young and the Gdansk Institute for Market Economics (Instytut Badań nad Gospodarką Rynkową) (2009), *Diagnoza stanu szkolnictwa wyższego w Polsce* (Diagnosis of Higher Education in Poland), *http://ptbk.mol.uj.edu.pl/download/aktualnosci/akt.diagnoza.pdf.*; Central Statistical Office (Główny Urząd Statystyczny) (2011d), *Szkoły wyższe i ich finanse w 2010 r* (Higher Education Institutions and their Finances in 2010), Central Statistical Office (Główny Urząd Statystyczny), Warsaw. Data updated based on the Ministry of Science and Higher Education communication in December 2012, based on updated GUS data.

Funding system and market for HE

Polish students can choose among institutions and thus, in principle, institutions compete for students. In practice, however, the higher education market is sub-optimal because of different funding arrangements for public and non-public higher education institutions.

There are two higher education markets in Poland: the market for tuition-free, fully subsidised programmes in public institutions, and the market for paid programmes. Fees are established by individual institutions; for example, fees for business programmes in public institutions in Wroclaw range from PLN 4 300 to PLN 5 400 per year (equivalent of three to four times the minimum wage).

Programmes requiring student fees, with a few exceptions, cannot compete with free programmes, since a student will not choose a programme requiring fees unless the returns to such a programme are higher than the returns to tuition-free studies, which is currently not the case in Poland. Ernst & Young (2009) observes that graduates with a Master degree who

studied for free are as likely to get a job as those who paid for their studies. While some students may choose part-time degree programmes at institutions that are close to their place of residence (to reduce the total cost of education), for many students fully-subsidised, free programmes are the first choice option. As a result, free and high-demand programmes tend to attract best performing students.

Public subsidies for teaching activities represent 56.5% of the total revenues of public institutions and are allocated according to a formula. Funding of the institution depends on the following criteria (weights are in brackets, they may differ depending on the type of institution): previous year funding (0.7), number of students and PhD students in fully subsidised programmes (0.3-0.45), number of teachers in full time equivalents (0.3-0.4), ratio of teachers to students (0.05-0.4), research projects (0.00-0.1), capacity to award academic titles (0.00-0.1), international exchange (0.00-0.05) (Ministry of Science and Higher Education, 2011). The funding formula favours the quantitative expansion of free programmes in public institutions while providing weak incentives to improve the quality of teaching and research, and responsiveness of the programmes to the needs of the labour market. However, the Ministry of Science and Higher Education has made efforts to introduce stronger focus on quality for example by launching the pro-quality funding that is described later in greater detail. It is also reviewing the regulation on the division of public subsidies to public and on-public HEIs, which will introduce greater focus on promoting the quality of teaching.

Higher education programmes requiring fees are offered by public and non-public providers. While in principle public funding is available only for free programmes in public institutions, in practice it also has positive effects on programmes with fees provided by public institutions. Courses with tuition fees in public institutions mimic the courses provided for free; the content and structure of the programme, teachers and classrooms are often the same. Sometimes, students who pay and those who study for free attend exactly the same classes. The cost of launching and running a programme requiring fees is therefore relatively low for a public institution. In addition, public institutions might also receive direct public subsidy for teaching activities in programmes with fees since it is very difficult to separate teaching hours in free and paying programmes. As a result, public institutions hold a privileged position in the fee paying higher education market due to a lower cost of entry in the market and the possibility of setting the price (tuition fee) below the marginal cost of the programme provision thanks to public subsidies. Public higher education institutions have managed to preserve their dominant position on the market and cater for the best performing students.

The higher education reform 2011 introduced pro-quality funding which boosts competitiveness between public and non-public higher education. The pro-quality grant is allocated to the best organisational units of public and non-public higher education institutions which receive the status of National Leading Scientific Centres (KNOW) for five years. In the first edition in 2012, six entities were chosen in Poland (in the fields of exact sciences, medical sciences, science on health and physical culture), each receiving PNL 10 million per year. The grants can be used for staff costs, for example hiring foreign academics. The selection of entities winning the pro-quality funding for the KNOW status is based on open competition and the selection is made by independent commissions involving international experts. While introducing KNOWS is a commendable initiative, if not carefully handled it may result in a two-speed higher education system. In addition, the grants for co-financing pro-quality measures can also be assigned for scholarships for the highest achieving PhD students, for public and non-public university departments offering high quality degree programmes (outstanding rate awarded by the Polish Accreditation Committee, (*Polska Komisja Akredytacyjna,* PKA) or implementing HEI's internal quality assurance systems and the National Qualifications Framework for Higher Education. In June 2012, the Minister of Science and Higher Education announced a competition for the best study programmes. The winners – 62 study programmes – receive additional funds to cover costs to launch students' apprenticeship programmes, to improve the teaching skills of teachers and to monitor graduates' career path etc. In Wroclaw, three units were successful in this competition: Silesian Higher School/pedagogy, journalism and social communication (practical profile), Wroclaw University of Economics/economy and the University of Wroclaw/politology.

In some fields, the demand for higher education has grown faster than supply in the public sector, which has left the room for the provision of higher education by non-public institutions. Programmes at non-public institutions were mainly created in fields popular with students and where provision of education was relatively cheap (*e.g.* business). On average, the quality of programmes offered by non-public providers is lower (see Figure 1.10).

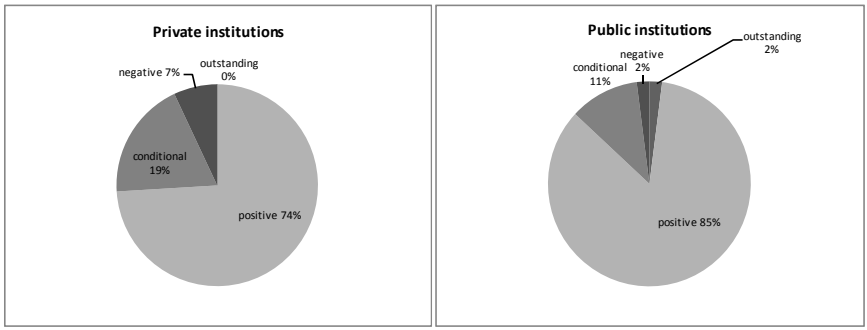
Quality and demographic development

The Polish Accreditation Committee (PKA) is responsible for quality assurance in higher education. It assesses the quality of education in individual programmes and advises the minister responsible for higher education on new institutions or new study areas (Fulton *et al.*, 2007). Between 2001 - 2008 it assessed 1% of programmes as outstanding, 82% as

positive, 13% as conditional, and 3% as negative (E&Y, 2009). Figure 1.10 splits the results between non-public and public sector. It shows that low quality is more of an issue in non-public institutions. The PKA evaluates programmes according to various criteria such as the number and qualifications of the staff, the level of research activities, the state of the infrastructure, and whether the programme meets teaching objectives and standards (see for example: Polish Accreditation Committee, 2009). Ernst & Young (2009) points out low minimum criteria set by the SAC and weak mechanisms and procedures for ensuring high quality of provided education at the institution level.

The 2011 Reform of Higher Education aims to reinforce links between funding of higher education institutions and the quality of teaching and research. It maintains the formula funding but increases funds that will be allocated as grants to the best performing institutions (Ministry of Science and Higher Education, 2011). It also enlarges the mission of the PKA, which will become responsible for evaluation of institutions in addition to programme assessment (Wroclaw's Regional Steering Committee, 2011). The 2011 Reform of Higher Education also introduces the new rules of designing curricula giving more autonomy to HEIs. Study programmes should be based on learning outcomes related to the National Qualifications Framework for Higher Education. This fundamental change is followed by respective amendments in the Quality Assurance process, highlighting the importance of the internal QA system and creating two parallel models of accreditation at the national level: programme accreditation and institutional accreditation (carried out by the Polish Accreditation Committee).

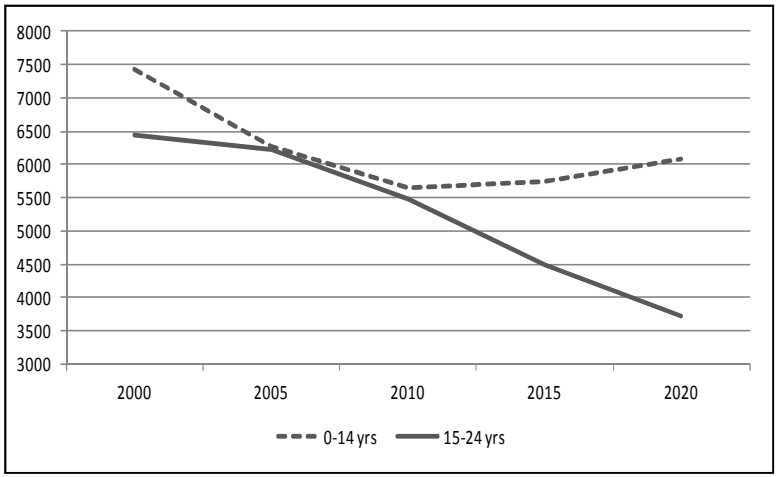
Figure 1.10. Assessment of programme quality in non-public and public institutions



Source: Ernst & Young and the Gdansk Institute for Market Economics (Instytut Badań nad Gospodarką Rynkową) (2009), *Diagnoza stanu szkolnictwa wyższego w Polsce,* (Diagnosis of Higher Education In Poland), *http://ptbk.mol.uj.edu.pl/download/aktualnosci/akt.diagnoza.pdf.*

A proliferation of low quality programmes was possible because of the fast-rising demand for education from students since the 1990s, but ageing demographics are placing pressures on the system. In coming years, however, the demand from students will stop growing or might even drop due to a shrinking population of young Poles. The number of 15-24 year-olds has been falling for the last ten years and is expected to shrink by 30% between 2010 and 2020 (see Figure 1.11). A falling youth population explains the decrease in the number of students enrolled in higher education in the recent years. Falling demand for higher education from individuals is likely to reinforce the competition between institutions. While this provides an opportunity to improve quality standards and encourage institutions to cater for non-traditional learners such as adults, incentives from government will help institutions to move to this direction.

Figure 1.11. Change in population by age in Poland



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2011), *World Population Prospects: The 2010 Revision, http://esa.un.org/unpd/wpp/index.htm.*

Equity concerns

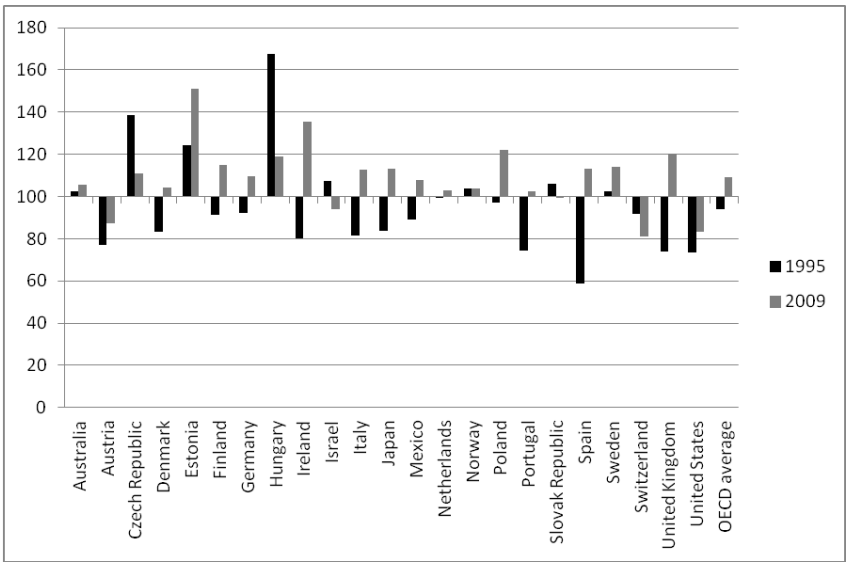
While the Polish Constitution guarantees free and equal access to public higher education, it does not guarantee free education: more than half of all HE students pay tuition fees in Poland. These are students in non-public higher education institutions (all higher education institutions charge tuition fees) and students in part-time programmes in public institutions. Students

combine work and study when they cannot afford to study full-time. Individuals also choose fee-paying programmes if their marks on the upper-secondary diploma do not guarantee them a place in a fully-subsidised and oversubscribed public programme. Often, these students follow exactly the same programme (in terms of the content and timetable) as those studying for free. Research studies indicate that students in paid programmes are more likely to come from less-affluent and less-educated families (Herbst and Rok, 2011). Despite the fact that these results should be treated with caution due to methodological problems (the individuals who left their family homes were excluded from the sample), they point to the possibility that in Poland a disadvantaged part of the population pays tuition fees and subsidises the public education to which it has limited access.

Who bears the cost of higher education?

Spending per student in Poland is relatively low. In 2009, it was USD 7 776 (using PPPs for GDP), almost half of the OECD average. This is not surprising given that Poland is one of the poorest countries among the OECD members. In terms of the proportion of the wealth devoted to higher education, expenditure per student averaged 41% of GDP per capita in Poland in 2009. This was below the OECD average, but above per-student expenditure in the Czech Republic, Slovakia and Slovenia (OECD, 2012a). Spending per student fell between 1995 and 2000, which was related to the rapidly growing enrolment in higher education, and rose between 2000 and 2008 (see Figure 1.12). However, per-student expenditure in Poland is likely be overestimated since it refers to the public sector only, in which the cost of education is twice as high as in the non-public sector (Central Statistical Office, 2011d).

Figure 1.12. Change in per-student expenditure



Note: How to read the table: for example, in Poland in 1995, per-student spending was 107% of per-student spending in 2000.
1.Public institutions only: Hungary, Ireland, Poland, Portugal, Switzerland.
2.Public expenditure only: Switzerland.

Source: OECD (2012a), *Education at a Glance 2012: OECD Indicators*, OECD Publishing. doi: 10.1787/eag-2012-en.

Polish households cover 19% of expenditure on higher education (OECD, 2012a), more than in many countries where higher education is, in principle, free (see Figure 1.13). In many countries, the financial burden that falls on families is alleviated by public subsidies for student grants, scholarships and loans. In Poland such subsidies are very low (1% of total expenditure[4]) and as a result have very limited effect on the redistribution of the cost of tertiary education (Figure 1.13).

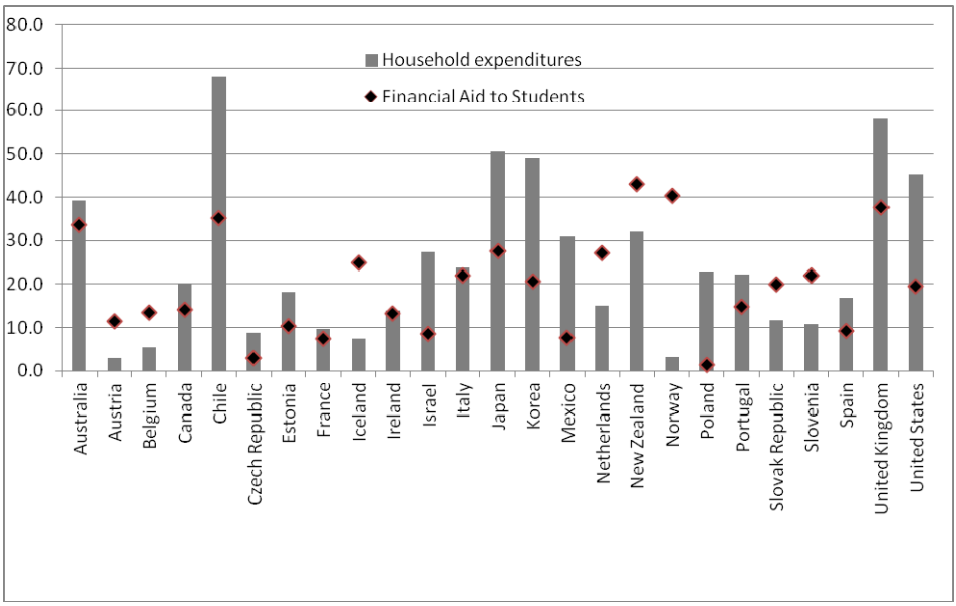
Students receive scholarships on the basis of family income or academic achievement. In 2010, 23% of all students received scholarships; 6 percentage points less than in 2005. The fall was related to the change in the eligibility criteria used by institutions (Central Statistical Office, 2011d). Students in free public higher education were somewhat more likely to receive "social" scholarships and as likely to receive "academic" scholarships as students in programmes with tuition fees. Scholarships differ across institutions that decide on the criteria of eligibility and the amount of the scholarship. In general, the aid received by students is relatively modest.

For example, in 2011 the maximum social scholarship at Warsaw University (department of mathematics, IT and mechanics) was PLN 602 per month and the scholarship for academic performance ranged from PLN 250-500 (Samorząd[at]mimuw.edu.pl, 2010). While the maxim social scholarship of PLN 602 is high in comparison to other family benefits and social assistance in Poland, it is useful to compare this with the minimum wage in 2011 which was PLN 1 386 in 2011 or for the first year not less than 80% of the minimum wage (PLN 1 108.8).

Recently, the Polish government has decided to channel more funds to low income students and reduce the amount of merit-based aid. Consequently, 60% of the total student support will be distributed on need- and 40% on merit-basis. Also, a maximum income threshold for need-based aid was raised by 30% (Ministry of Science and Higher Education, 2012a).

Figure 1.13. How much families spend on higher education

Household expenditure and financial aid to students as a percentage of total expenditure for tertiary education (2009)



Note: Financial aid to students includes: scholarships, grants to households, and student loans. Reference year is 2008 for Canada and 2010 for Chile.

Source: OECD (2012a), *Education at a Glance 2012: OECD Indicators*, OECD Publishing. doi: 10.1787/eag-2012-en.

Since 1999, students from less well-off families can take out student loans, regardless of whether they study at non-public or public institutions. Students receive monthly instalments ranging from PLN 400 to 600. In 2009, the scheme attracted only 16% of students and the majority studied in free fully subsidised programmes (E&Y, 2009). This rate applies to beneficiaries in a given year with student loans. Since 2010, a monthly instalment has been PLN 600. In 2009, there were 16 600 new loans granted, compared with 17 500 in 2010 and 12 700 in 2011.

Governance structure in public HE

Responsibility for higher education is divided between the relevant ministry and individual institutions. Institutions are created, merged and closed through legislative acts. Before the 2011 Higher Education Reform, programmes were approved and named by the minister. He/she also defined broad guidelines on the content of the programme – skills and competencies developed by students during the programme. According to the new law, departments with the "habilitation" (an academic degree) capacity can now create programmes without a ministerial agreement. Programmes no longer need to follow the broad guidelines defined by the Ministry, but should lead to outcomes identified in a new qualification framework. These changes are now being implemented and it is therefore too early to identify their impact. Drawing on other countries experience, it can be said that a system relying on qualification framework and defining objectives in the form of learning outcomes is successful if qualifications are widely recognised by employers and if there are accountability mechanisms in place (OECD, 2010c).

Higher education institutions are governed by collective bodies (*senat, rady*). The single-person authorities of HEIs are rectors as well as the heads of academic units who are chosen among members of the faculty by electoral colleges (according to the new reform, institutions are given an opportunity to select rectors through competitions open to outsiders). In such an arrangement, the choice of programmes and their content are more likely to reflect interests of the provider rather than that of consumers (students and employers). As a result, the provision might be heavily supply-driven. While the new Higher Education Act provides an opportunity to appoint academic leaders in open competition, public universities have opted for more traditional governance system with elected leaders.

While students can in principle vote with their feet and eliminate poorly performing institutions from the market, in the Polish context the student impact on higher education market is limited. This is due to three reasons: i) until recently the demand for higher education was growing quickly and there was demand even for poor quality higher education, ii) the higher

education market is distorted as argued above, and iii) information on labour market outcomes of graduates by field of study and institution type is incomplete and fragmented.

The new Higher Education Reform intends to reinforce student and employer position on the market, but challenges remain. For example, the reform intends to better guide student choices by requiring each institution to track employment outcomes of their graduates. Some institutions such as Wroclaw University of Technology (*Politechnika Wrocławska)* already collect the relevant data while others have not started yet. Given that individual institutions are responsible for the collection of data and there is no common methodology of data collection, the comparability of information might be at risk.

While some OECD countries have made efforts to provide complete, updated and easily available data that can inform student choice and provide career guidance, Poland needs to improve information on labour market prospects. To improve students' access to good quality information, many countries collect career-related data at the national level. In Denmark and Switzerland, students can check information on wages and employment prospects in various professions and regions, programme content and financial aid, and education and training providers through websites (Danish Ministry of Education, 2012; MyOrientation, 2012). Currently, Poland has a website providing information on individual institutions, such as on their addresses, programmes of study, and awarded titles (Pol-On, 2012). However, career-relevant information, such as on labour market prospects by field of study and type of institutions, is still missing.

Teachers

In 2009, there was an average of 17.8 students per members of the teaching staff in Poland, but this figure blurs large differences between the non-public and public sector and across fields of study. While in public institutions there were less than 15 students per teacher, in the non-public sector the ratio was 32 students per teacher (Central Statistical Office, 2011d). Popular fields of study where enrolment have increased considerably (business, pedagogy) recorded also an above-average student-teacher ratio (Central Statistical Office, 2011d).

Until recently, teachers could be employed in more than one institution and hold more than one job, which has resulted in challenges in quality of teaching and limited time for research. Typically teachers employed in public higher education institutions also worked for non-public institutions. For many teachers, the non-public institution was the second or third employer. In 2011, only 3% of teaching positions in the non-public sector

were filled by teachers who were primarily employed by these institutions while in the public sector this number was close to 70% (Central Statistical Office, 2011d). Teachers in high-demand fields were also more likely to hold many jobs. Such multiple employment causes many problems: it is likely to lower the quality of teaching and leaves less time for research activities (Fulton *et al*., 2007). Relatively low wages of teachers might be one of the reasons for multiple employment. Ernst & Young (2009) points out that wages of the majority of academic staff of Warsaw University were below the average the wage in the region (*voivodeship mazowieckie*).

Authorities have taken steps to reduce teachers' multiple employment, but not addressed the issue of wage levels at public institutions. The new Reform of Higher Education makes multiple employment more difficult (teachers cannot hold more than two jobs, and those who wish to work at different higher education institutions must seek the rector's agreement). If there is no change in the wage system, however, it is likely that the best teachers will leave public institutions for better paid jobs.

Polish higher education staff is ageing, partly due to national policy requirements. The average age of academic teachers is relatively high and has been increasing over time (Table 1.2). High number of retired staff at higher education institutions is related to the funding mechanisms that reward institutions for having staff with professor titles, and that make some institutional activities, such as opening new programmes, conditional upon the number of staff members with the title of professor.

Table 1.2. Change in the age structure of HE teachers

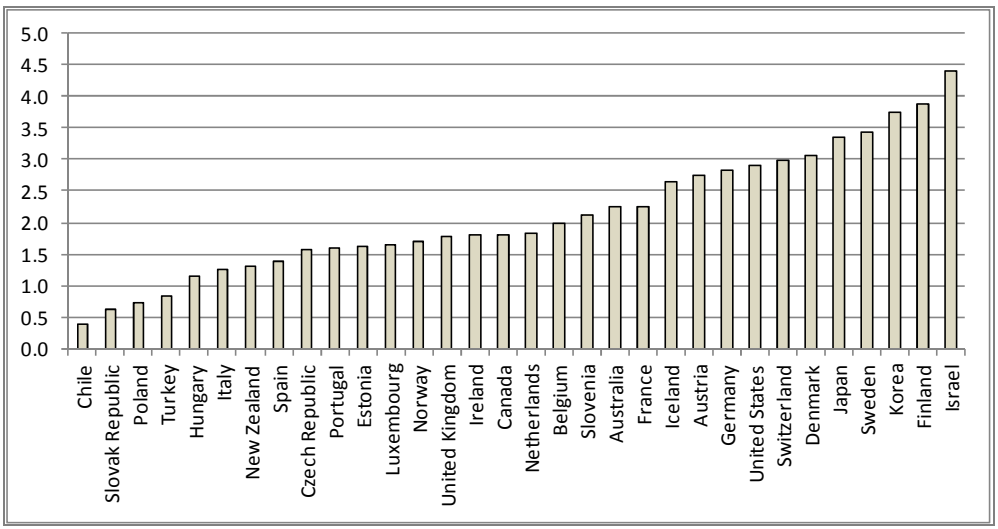
	Teachers with a doctor title (doctor and doctor *habilitowany*)		Teachers with a professor title	
	1995	2000	1995	2000
29 and below	0.6	1.9	-	-
30-39	18.9	24.1	0.5	0.2
40-49	46.7	33.5	9.8	6.7
50-59	26.5	30.8	33.7	35.9
60 and above	7.3	9.7	55.9	57.2

Source: Ernst & Young and the Gdansk Institute for Market Economics (Instytut Badań and Gospodarką Rynkową) (2009), Diagnoza stanu szkolnictwa wyższego w Polsce (Diagnosis of Higher Education In Poland), *http://ptbk.mol.uj.edu.pl/download/aktualnosci/akt.diagnoza.pdf*.

Research and development

Poland's investment in research and development (R&D) compared to its GDP is one of the lowest among OECD countries (see Figure 1.14). It has increased over the last seven years but is still below the 1990 level (see Figure 1.15).

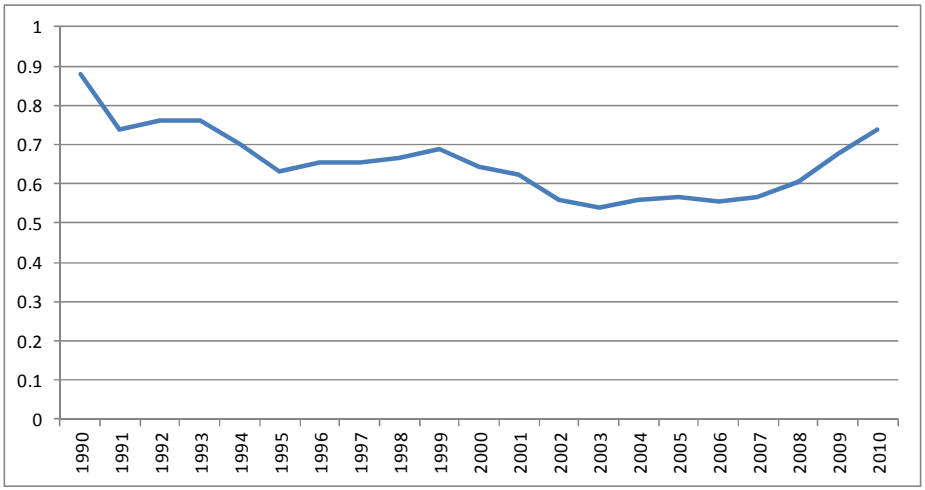
Figure 1.14. Gross Domestic Expenditure on R&D as a percentage of GPD



Note: 2008 year of reference: Australia, Chile and Switzerland. 2009 year of reference: Japan, New Zealand, and the USA.

Source: OECD (2012b), *Main Science and Technology Indicators, Vol. 2011/2,* OECD Publishing. doi: 10.1787/msti-v2011-2-en-fr.

Figure 1.15. Gross Domestic Expenditure on R&D (GDER) as a percentage of GDP in Poland (1990-2010)



Source: OECD (2012b), *Main Science and Technology Indicators, Vol. 2011/2,* OECD Publishing. doi: 10.1787/msti-v2011-2-en-fr.

61% of R&D in Poland is funded from public sources. Businesses' participation in R&D expenditure is very low and has been falling since 2007. Currently, it represents only one quarter of the Gross Domestic Expenditure on R&D (GERD). This means that the growth in GDER observed recently in Poland resulted from an increase in public spending on R&D. Currently, expenditure on R&D per student represents 14% of total per student spending.

The low level of R&D in Poland reflects the development level of the country, weak conditions for innovation, insufficient linkages between public research and industry, and an industrial structure dominated by companies with low and medium technology (OECD, 2010a). In Poland, employment is dominated by blue collar jobs (*e.g.* plant and machine operators, jobs in crafts and related trade workers) and the share of jobs requiring high-level skills usually associated with higher education is still relatively low, despite the rapid increase in higher education attainment in recent years. In most developed economies, on the contrary, high-skill jobs account for the largest part of the employment market and are growing in numbers. The shift towards more skilled jobs is often associated with the introduction of new technologies in workplaces (see Acemoglu and Autor, 2011; Autor *et al*., 2003). In this context, keeping other factors constant,

more investment in R&D is likely to increase the share of skilled employment in the Polish labour market.

The OECD (2010a) argues that without higher investment in R&D, Poland will not be able to benefit from the transfer of technologies and knowledge brought by foreign direct investment (FDI). Causation, of course, runs in both directions – creation of high-skill employment increases the demand for high-skilled workers, while highly-skilled labour available on the market also contributes to the creation of high-skill jobs. In the first case, the focus is on the demand side, in the second it is on the supply side, mainly on the quantity and quality of education and training.

Polish authorities have taken steps to improve the quality of research and the transparency of funding allocation. In 2009, Ernst & Young argued that the criteria according to which funds were distributed were unclear and, as a result, the system of R&D funding was not transparent. The new science and higher education reforms in Poland aims to promote better quality research by improving the transparency in the system, increasing the role of competitive funding, and linking block funding on R&D to the performance of the institution. The reforms:

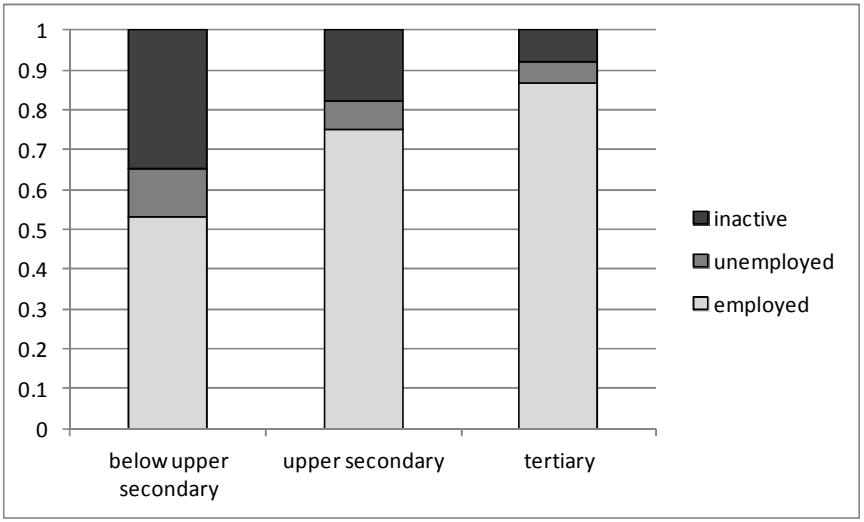
- Establish the National Science Centre (Narodowe Centrum Nauki) that is responsible for financing basic science and young researchers (205 of budget is dedicated to this group).
- Stimulate co-operation with the private sector by increasing the competence of the National Centre for Research and Development (Narodowe Centrum Badań i Rozwoju) which is responsible for financing applied research and strategic research programmes as well as implementing EU Structural Funds dedicated to R&D.
- Link funding to the performance of the research entity by allocating more funds through competitive grants and by conditioning funding on periodical evaluation of entities responsible for R&D. Evaluation will be run by an evaluation Committee (Komitet Ewaluacji Jednostek Naukowych), an advisory body to the minister.
- Reward university departments granted the status of Leading National Research Centres (Krajowy Naukowy Ośrodek Wiodący) with additional funding. The status will be granted for five years to the best performing centres.

On 2011, the National Research programme and the Polish Roadmap for Research Infrastructure were introduced, which should lead to increase in the concentration of the public funding on the main national priorities and investments.

Labour market prospects of HE graduates

Higher levels of education are associated with higher earnings and better employment opportunities in OECD countries, including Poland.

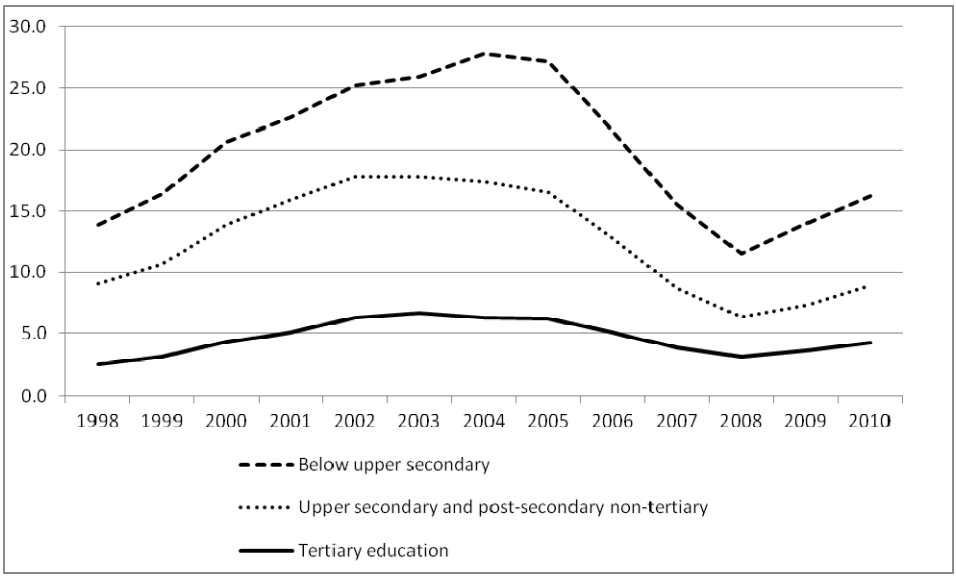
Figure 1.16. Labour market performance among 25-34 year-olds in Poland, 2009



Source: EUROSTAT (2011) EU Labour Force Survey Database, *http://epp.eurostat.ec.europa.eu/portal/page/portal/employment_unemployment_lfs/introduction*.

Despite the rapid growth in the supply of higher education graduates, the premium for higher education credentials has been maintained. The share of adults with higher education more than doubled in Poland between 1997 and 2010 to reach 23% in 2010 (OECD, 2012a). Figure 1.17 shows that higher education graduates are less likely to become unemployed, in particular in a depressed labour market. This might be explained by a growth in the demand for workers with higher education from employers overwhelming the countervailing factor of growth in the number of workers with higher education.

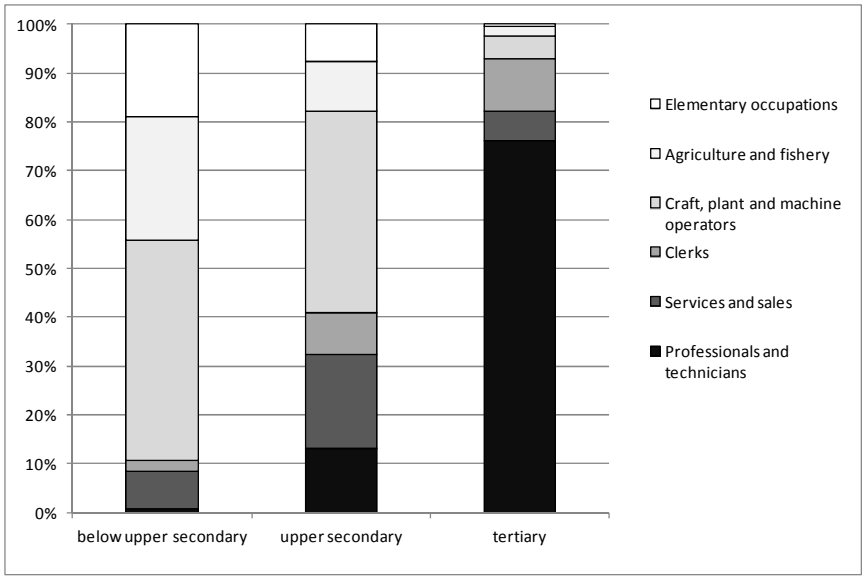
Figure 1.17. Unemployment rates among 25-64 year-olds in Poland by education level



Source: OECD (2012a), *Education at a Glance 2012: OECD Indicators*, OECD Publishing. doi: 10.1787/eag-2012-en.

Higher education diploma holders in Poland continue to perform better than those with lower educational attainment in terms of job characteristics and earnings that measure outcomes from education. Figure 1.18 shows that the majority of 25-34 year-old workers (recent graduates) are in jobs requiring high skills (professionals and technicians)[5] while those with upper secondary education and below are typically in occupations relying on middle and low skills. In 2010, the average income of workers with higher education (25-64) was 169% of that of workers with an upper-secondary diploma. This is 10 percentage points less than in 2004 implying a slight drop in the wage premium associated with higher education over time. Poland is among the OECD countries with the highest private and public returns to investment in higher education (OECD, 2012a)

Figure 1.18. Distribution of workers by type of education across occupations



Source: EUROSTAT (2011) EU Labour Force Survey Database, *http://epp.eurostat.ec.europa.eu/portal/page/portal/employment_unemployment_lfs/introduction*.

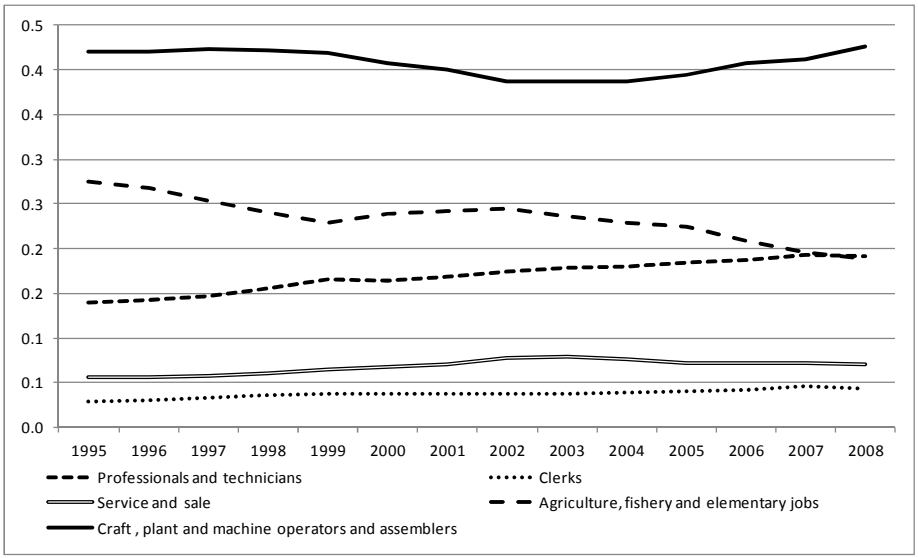
Employment structure

In 2008, more than 40% of all jobs in Poland required middle and low skills and were in the sector of craft and manufacturing. Figure 1.19 shows that after an initial drop at the end of the 1990s, the importance of these jobs in the employment structure has risen again since 2003. The share of high skill occupations (professionals and technicians) in the total employment clearly increased between 1995 and 2008.

Poland needs to move up in the value chain and offer better skills and jobs. In comparison to developed economies, more people in Poland are employed in low and medium-skill jobs and fewer in high-skill occupations. This is partly caused by the industry structure and foreign companies shifting to Poland production activities relying on cheap and relatively unskilled labour. This situation is likely to be unsustainable in the long run as the cost of labour is rising in Poland. In response to this challenge Poland might move to a model relying to a greater extent on high-skill employment. This would require more investment in activities that yield high skill jobs

(*e.g.* R&D) on the one hand, and on the other a policy increasing a stock of highly skilled labour in the market (see also Kuczera, submitted).

Figure 1.19. Share of employment in Poland, by employment type, 1995-2008



Source: International Labour Organisation Department of Statistics (2012), LABORSTA Internet, *http://laborsta.ilo.org*.

Links with the labour market

Polish higher education is relatively poorly connected the labour market. Higher education institutions are responsible for co-operation with business and employers. While some institutions have developed strong links with the labour market, in others such links are weak. There is some evidence indicating that students are not well prepared for jobs upon completion of their studies. A survey among enterprises revealed that only 40% of employers think the availability of qualified labour is good or very good (The Gdansk Institute for Market Economics (*Instytut Badań nad Gospodarką Rynkową*), 2008). Another study evaluated the match between knowledge and skills of higher education graduates in technical fields and employers' expectations (IBC Group, 2009). It found that the majority of respondents reported that they struggled to find workers with appropriate skills. One employer in three indicated that graduates were poorly prepared for work and required additional training. Estimated training time was one to

36 months. According to employers, obligatory practical training in companies and stronger links between the programme content and local labour markets might potentially improve job-related skills of graduates. Similarly, the majority of higher education teachers think that the content of the study programme should be better adapted to labour market needs (E&Y, 2009).

In many OECD countries, vocational higher education institutions have grown in number and size to fill a gap in the education market arising from employers' increasing demand for higher professional and technical skills, as well as rising demand for high-level education from groups that traditionally did not participate in post-secondary education. In Poland, vocational higher education institutions (*Publiczne Wyższe Szkoły Zawodowe*) (typically classified as ISCED 5A) were created in 1997, but their links with the labour market are weak.

Polish authorities have recognised the need to improve co-operation between higher education institutions and business. For example as a response to the employer demand for skills, the government has introduced a programme of ordered courses of studies, initiated by the Ministry of Science and Higher Education in 2008. These studies aim to increase the number of mathematics, technical and natural science students. The third edition of the ordered courses of studies was announced in February 2011. It is expected that PLN 1 billion will be allocated to the implementation of the programme of ordered by 2013.

The 2011 reform have aimed to strengthen the collaboration between higher education institutions and business and industry by a number of ways. The law introduced a practical profile of studies with participation of practitioners in the curricula design, teaching process and evaluation of its outcomes. For example before designing study curricula all HEIs must choose a study profile: academic or practical one. In practice this change has been important to vocational higher education institutions. The law also required all HEIs to track graduate employment outcomes. The Ombudsman for Graduate Affairs has been appointed to monitor the alignment of curricula with the labour market needs. Additional funding can now be channelled to HEIs with evidence of strong links with socio-economic environment. HEIs can also establish spin-offs to facilitate commercialisation of the outcomes of scientific research. One of the key elements of the 2011 reform of higher education was the introduced the new rules of designing curricula, which give more autonomy to HEIs and require that study programmes are based on learning outcomes related to the National Qualifications Framework for Higher Education. This may encourage HEIs to step up their efforts to develop internship programmes.

The Polish higher education reform has given fresh impetus for more relevant higher education and research, but challenges remain in the practical implementation of collaboration, measuring of results, and incentives for staff. Positive changes include the fact that public authorities are be able to commission a programme in response to demand from employers. Also the responsiveness of higher education to labour market needs will be one of the criteria of the quality assurance process. In addition vocational higher education institutions, are obliged to create bodies (convents) in which employers will be represented. The downside is that similar obligation is not applied to universities. At the same time it also remains unclear how closer co-operation between higher education institutions and employers will be achieved and measured in practice. For example, the funding formula for teaching activities, which provides limited incentives for institutions to collaborate with employers, has so far remained in place, although the Ministry of Science and Higher Education is considering changes to the basic funding formula and the pro-quality funding and EU Structural Funds have provided some incentives to this direction. Another major problem is a poor tradition of co-operation between business and the higher education sector. Additionally, employers in Poland are less well-organised than employers in some other European countries. The question, therefore, is to what extent employers sitting on the boards will be representative for the whole sector.

Notes

1. Net enrolment rate is calculated by dividing the number of students of a particular age enrolled in HE by the number of people in that age (OECD, 2004).
2. The definition of skills draws on the definition from the IALS study. It focuses on applied knowledge and skills: how information is understood, transformed and applied in various contexts and situations.
3. These are institutions receiving limited funding from the government. They receive less than 50% of their core funding from government agencies and their teaching personnel are not paid by a government agency (OECD, 2004). Other categories include public and government-dependent private institutions. Government-dependent private institutions receive 50% or more of their core funding from government agencies or their teaching personnel are paid by a government agency (OECD, 2004).
4. According to comments received from the Polish Ministry, public subsidies account for not less than 7% of the total expenditure.
5. Professional group "includes occupations whose main tasks require a high level of professional knowledge and experience in the fields of physical and life sciences, or social sciences and humanities. The main tasks consist of increasing the existing stock of knowledge, applying scientific and artistic concepts and theories to the solution of problems, and teaching about the foregoing in a systematic manner. Most occupations in this major group require skills at the fourth ISCO skill level. Technicians and associate professional group "includes occupations whose main tasks require technical knowledge and experience in one or more fields of physical and life sciences, or social sciences and humanities. The main tasks consist of carrying out technical work connected with the application of concepts and operational methods in the above-mentioned fields, and in teaching at certain educational levels. Most occupations in this major group require skills at the third ISCO skill level" (International Labour Organization, 2004).

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Annex 1.A.1. Improving responsiveness of vocational HE to labour market needs – a comparative perspective

This annex provides broad guidance to assist vocational higher education (VHE) in developing stronger links with employers and labour market broad. It draws on an article discussing VHE in a comparative perspective, which was prepared in the framework of *Skills Beyond School*, an OECD review of vocational post-secondary education and training (Kuczera, submitted).

Getting the right number of trained people

In order to ensure that the supply of graduates meets demand, the number of graduates from a programme should correspond to the number of available job positions in the sector. The number of available jobs depends on the cost of labour, the total stock of labour with relevant education and training already in the labour market, staff turnover, and other factors, such as technology, affecting the demand for people with particular credentials. The supply depends on student preferences, financial constraints of institutions and involvement of employers in vocational higher education. While vocational higher education policy and interventions at the institution level influence the supply of graduates with specific education and training, their impact on the demand side is limited. As a result only the former is discussed here.

Better information on labour market outcomes for students

A labour market make-up driven by student preferences increases the risk of mismatch between demand and the supply of skills, since the labour market outcomes of a programme are only one factor influencing student choice. At the same time, complete, regularly updated and easily available information on labour market prospects can potentially improve the link between student preferences and employer demand for skills. A German study (Heckhausen and Tomasik, 2002) confirms that information on labour market prospects can influence student perception of their "dream job". Better overall information on labour market prospects in various professions and more weight given to these prospects by students also have an impact on institutions.

When institutions compete for clients they tend to offer programmes popular with students. Thus, if students are more likely to enrol in programmes providing good preparation for jobs, institutions provide more of these programmes in order to attract more students. Indirectly, informed student choice exerts pressure on institutions to

improve the quality of programmes, as the lower the expected quality of the programme, the lower the expected skills, productivity and labour market outcomes of the graduates.

Imperfect information, however, often prevents students from choosing programmes and institutions that best match their preferences. Students might not be aware that some institutions offer better preparation than others. To overcome this problem, institutions running successful programmes might publicise information on the labour market performance of their graduates. The relevant data can be collected through regular follow-up surveys of the graduates or through official data bases, if available. A recent US initiative addresses the issue of imperfect information in the vocational higher education market, particularly in respect of institutions that enrol students in programmes leading to poor job prospects and with a low likelihood of loan repayment. The initiative requires recruiters and promotional materials for career colleges to disclose information on debt burdens of former students for programmes with weak labour market outcomes (U.S. Department of Education, 2012).

Financial incentives

Vocational higher education providers often find it difficult to continuously adjust the mix of vocational higher education programmes to match labour market needs. There are two reasons for this. First, institutions might have poor knowledge of changing requirements in local labour markets. Better information and stronger local links between vocational higher education providers and employers are therefore a potential solution to this problem, as discussed below. Second, continuous adjustment of the labour market make-up is costly and sometimes disruptive. Expanding or creating new programmes requires upfront investment in teaching staff and new infrastructure (buildings, classrooms and workshops), while reduction of programmes in size often leaves infrastructure and staff underemployed.

Some countries offer financial incentives for institutions to expand and develop programmes with good labour market prospects. In South Korea, the government has recently introduced a formula funding regime based on the employment outcomes of graduates to improve junior college graduates' preparation for labour market requirements. The direct impact of this initiative on institutions is small, as the formula funding represents a relatively modest contribution to junior colleges' total budget (Kis and Park, 2012). Targeted, often one-off grants are available to vocational higher education providers in some countries, such as the U.S. Grants are awarded for various purposes, such meeting skills shortages, *e.g.* in the area of renewable energy and the health sector. A key advantage of targeted grants is that they allow a quick response to the changing demand for skills and, if grants are competitive, they allocate the money, in principle, to the institutions most likely to make a good use of it. On the other hand, they require more administration staff to handle grant applications in institutions and are often short-term only (see for example Huffman and Evenson, (2006) for comparison of competitive grant and formula funding in agriculture).

Accounting for employers needs

Asking employers about the skills they require is another way of accounting for company needs in the provision of vocational higher education. To ensure employers' participation in vocational higher education, many countries have introduced a legal obligation for stakeholders and institutions to consult employers on various matters including the mix of skills supplied to the labour market. This often translates into

inclusion of labour market representatives on governing boards of institutions. In Denmark and the U.S. (South Carolina), institutions cannot open new programmes unless they can demonstrate that there are opportunities for employment in the specific field of proposed study. Ongoing programmes are also assessed according to their labour market performance. In South Carolina at least half the graduates receiving associate degrees must be placed in a job related to their programme or continue in education on full-time basis (Kuczera, 2011). These measures, in effect, oblige institutions to study the market for graduates and liaise closely with employers.

The willingness of employers to provide workplace training provides a good indicator of employer needs. Westergaard and Rasmussen (1997) found that Danish companies that recruit more staff (other than apprentices) also train more apprentices[1], indicating that companies that are expanding their production capacities are more likely to provide training to students. In Spain and Denmark, provision of vocational higher education is closely tied to workplace opportunities for students. Institutions cannot provide more places in a programme than the number of training places available to students in the specific field.

The integration of workplace training into programmes means that institutions must connect with employers to secure training places and ensure that training meets students' and employers' expectations. This creates some additional workload for institutional staff. Some institutions (*e.g.* in Denmark) solve this problem by creating a coordinator position to take care of all matters concerning workplace training arrangements. Workplace training can also be beneficial to institutions, as it reduces the cost of the programme and provides opportunities for the teaching staff to get acquainted with recent technologies adopted by companies.

Planned provision

Planned provision is another way of meeting employers' needs. In some fields, such as nursing, the state is often the main employer. It may then directly regulate labour market provision by setting an upper limit on the number of training places in the programme (see Annex 3 in OECD (2008) for country examples). Some countries also control labour market provision in other fields according to broad skills forecasts. Such systems allow for various forms of direct and indirect control of training places in state-sponsored training institutions. Institutions face two challenges in a planned provision system. First, if the forecast is unreliable, their programmes result in poor labour market outcomes and might become less attractive to students. Second, bureaucratic controls mean that institutions may not be able to react quickly to changing demand for skills from students and employers.

Getting the right mix of skills

The responsiveness of post-secondary vocational institutions to labour market needs depends not only on the mix of programmes but also on the skills provided by each programme. The aim of a vocational higher education programme is to provide the skills and knowledge necessary for successful accomplishment of tasks on the job. When students are trained on old equipment or do not learn about important aspects of their field they finish their studies badly prepared for jobs. As a result, their comparative advantage in specific occupations is low and employers are more likely to hire people with other credentials. For institutions, this may result in decreasing enrolment, lower public funding and lower value of the credentials they provide on the labour market.

Institutions therefore need to consider both employer needs and student interests when determining the set of skills that students develop through the programme (the content of the programme). Employers are primarily interested in skills that allow graduates to contribute to productive activities in their companies. From the student point of view, company-specific skills that secure smooth transition to employment are important, but not sufficient. Skills that increase their mobility across companies and sectors – transferable, sector-related skills and general skills – are also necessary. To identify a set of skills beneficial to students and employers, institutions need to take into account many factors, assuming they participate in the creation of the content. Some of them are addressed below.

Funding principle

When defining the content of a programme, institutions might follow an economic principle that states that the benefits of an investment are shared among those who made it. Thus, those who pay for vocational higher education programmes should decide on the skills provided by the programme. Consequently, when vocational higher education programmes are funded by public sources, such as students and employers, benefits from the skills provided by the programme should be shared by students, employers, and society as a whole. Programmes funded by public sources should yield positive outcomes for students and employers, as they create positive externalities for society (higher tax revenue, lower expenditure on unemployment benefits, etc.). Public funding being equal, the amount of company-specific versus transferable and general skills should be proportionate to the relative contributions of employers and students. Two extreme cases, when either employers or students cover the total costs of a programme, are shown here to illustrate how the funding source impacts the skills provided by the programme.

- If an individual employer bears the cost of the programme, there is an argument that the programme content should be dominated by employer-specific skills. Students benefit as long as they stay with the same employer. Thus, from the student point of view, the positive effect of the training is likely to disappear in the long run.

- If a student covers the total cost of the programme, the expectation is that it will offer future benefits related to better employment prospects, among other things. Consequently, students are also interested in developing skills that correspond to company needs

To conclude, all programmes but those fully funded by employers should provide skills reflecting both student and employer needs.

Transferable versus company-specific skills

Employers are in a good position to judge what mix of skills is optimal for specific occupations and, therefore, it makes sense for them to play a key role in deciding the content of the programme. Qualifications recognised by all employers in the sector are transferable across these employers and provide a good indication of skills required in the specific field. Collectively, employers have an interest in a flexible and adaptable labour force and are therefore interested in a range of skills that fits the needs of all, rather than one particular employer.

Many vocational higher education institutions contribute to local economic development by providing skilled labour to local employers. Consequently, many vocational higher education programmes are designed to respond specifically to local business needs. If there is no direct relationship between vocational higher education institutions and local companies, some employers, particularly small businesses, may find it hard to communicate their skill requirements. A local cooperation framework also permits a flexible and quick adjustment of programme content due to changes in technology and production methods introduced by local companies. This is possible because companies negotiate and agree changes directly with institutions, avoiding many intermediary levels and bodies. In many systems but not all (*e.g.* Denmark, South Carolina, Texas), employers are part of the governance structure of the institution. Local autonomy in skill definition not only allows the programme to respond to changes in the labour market structure, but also to desired modifications in the job market. South Carolina uses the VHE system to attract foreign investment and retain local investment in the state. It offers tailor-made programmes provided by technical colleges to local industry and financial incentives in the form of free, off-the-job training for employees for companies creating new employment in the state.

If an employer's influence is too dominant, however, programmes may give too much weight to company-specific skills and too little to the transferable skills vital for student mobility between firms and geographic regions. As a result, institutions should ensure that locally-defined content is balanced by nationally/regionally agreed standards, if available. In this case, students who acquire skills that reflect local labour market needs must additionally acquire common core competencies that correspond to national/regional standards. For example, students in programmes that prepare for jobs in the oil and gas industry learn a range of skills and knowledge applicable across the industry, while additionally developing competencies relevant to specific extraction methods that depend on their geographical location (extraction from bituminous sands or sea wells). The fact that some skills developed on the programme are transferable means that a graduate from an oil and gas programme with a specialisation in oil extraction from bituminous sands should still be able to find a job in a company working in the oil and gas field, but not specialising in bituminous sands.

General skills matter too

An increasing number of employers expect workers to adapt to new work requirements, solve unknown problems and communicate effectively with others. General skills such as literacy and numeracy underpin these competencies. Weak general skills are often a problem in upper-secondary VET programmes, as VET students spend less time on activities fostering literacy and numeracy skills than those in more academic pathways (OECD, 2010b). In principle, poor literacy and numeracy is less of an issue in vocational higher education than in upper-secondary VET, as those entering vocational higher education programmes are often required to have upper-secondary qualifications. In practice, however, some vocational higher education participants suffer from poor general skills. This is related to the fact that vocational higher education caters to a population with diverse needs and levels of academic preparation. It provides a pathway for those who want to pursue their education above upper-secondary level, but for whom university (or equivalent) is not a viable option.

Weak general skills can seriously undermine a student's capacity to follow and complete the programme. For institutions, this involves a high student turnover rate and a more challenging teaching environment. For individuals and society, this involves lost

opportunities and money. To assist individuals lacking general skills, institutions in some countries, such as the U.S. and Denmark, encourage students to participate in remedial courses before starting on vocational higher education programmes. They identify students who lag behind in general skills and who might benefit from remedial courses through a systematic assessment of the skills of new students. In Denmark, a reduction in the dropout rate among vocational higher education students is one of the national policy objectives and institutions are held responsible for it. The amount of funding they receive from the state depends on the progression and completion rate in the student intake.

1. This study evaluates impact of various factors on provision of training to upper secondary students (apprentices). The results are likely to be similar for post-secondary vocational students.

Annex 1.A.2. Basic indicators

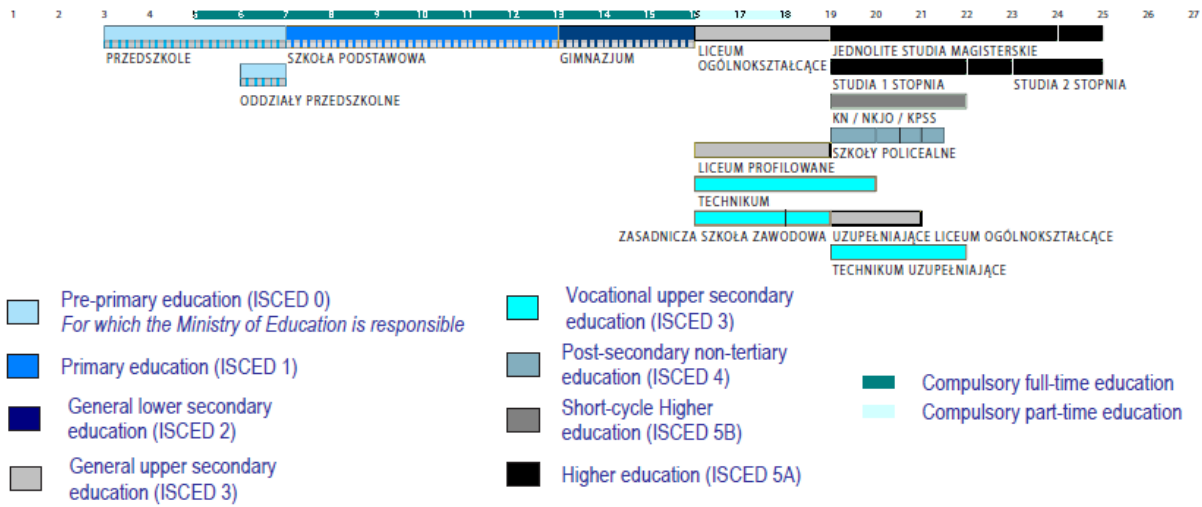
Table 1.A.2. Basic Statistics of Poland (2008)

THE LAND		
Area (km2):	312 679	
Arable land (% of total area):	59	
THE PEOPLE		
Population (million, mid-year):	38.1	
Rural population (% of total, mid-year):	38.9	
Life expectancy at birth:		
Male:	71.3	
Female:	80.0	
Infant mortality (per thousand):	5.6	
Employment (million):	15.8	
Employment by sector (% of total):		
Agriculture:	14.0	
Industry (including construction):	30.8	
Services:	55.2	
PARLIAMENT		
Bicameral parliamentary system		
Sejm membership (lower house):	460	
Senate membership (upper house):	100	
PRODUCTION		
GDP (PLN billion, current prices):	1 272.8	
GDP per capita (USD, market exchange rate):	1 386.1	
PUBLIC FINANCE		
General government budget balance (% of GDP):	-3.7	
General government revenues (% of GDP)	39.6	
General government expenditures (% of GDP)	43.3	
Public debt (end-year, % of GDP)	47.2	
CURRENCY		
Monetary unit:	zloty	
Currency units per:	USD	EUR
Average 2009:	3.1191	4.1724

Source: OECD (2010a), *OECD Economic Surveys: Poland 2010*, OECD Publishing. doi: 10.1787/eco_surveys-pol-2010-en..

Annex 1.A.3. Structure of the National Education System in Poland

Figure 1.A.3. Structure of the National Education System in Poland 2011-2012



Source: Eurydice (2011), "The Structure of European Education Systems 2011/2012: Schematic Diagrams," Education, Audiovisual, & Culture Executive Agency, European Commission, *http://eacea.ec.europa.eu/education/eurydice/documents/tools/structure_education_systems_EN.pdf.pdf.*

Chapter 2.
Human Capital and skills Development

Since Poland's transition to democracy in 1989 and accession to the European Union in 2004, the higher education system in Poland and Wroclaw has grown in terms of the number of students and higher education institutions (HEIs). This growth is now levelling out and the higher education system is facing new challenges. This chapter examines how effectively HEIs contribute to meeting the social and economic needs of the population in terms of the opportunities to study and the relevance of skills and competencies offered. It identifies the main strengths and challenges in creating a high quality tertiary system that supports equity, relevance and life-long learning. The chapter concludes with a series of recommendations for national government, local and regional authorities and HEIs to improve human capital and skills development in Wroclaw.

Introduction

Higher education in Poland has experienced rapid growth and transformation in recent years. The number of tertiary students has grown from a little over 400 000 in the early 1990s to 1.8 million in 2011. Since 1990, higher education legislation has enacted major changes in 1990, 2005 and 2011. With these changes, Poland has sought to align its higher education system with the principles of the Bologna Declaration, the European Higher Education Area (EHEA) and the European Research Area (ERA).

EU funding and foreign direct investments are transforming the economy of Poland and Wroclaw. Poland is rapidly moving from a predominantly agricultural and manufacturing-based economy to a knowledge-based economy. Poland has successfully absorbed significant amounts of European funding, including EUR 80 billion from the EU Structural Funds, part of which has been channelled to Lower Silesia and its key city: Wroclaw. Human capital and relatively low costs have contributed to Poland's strong position in attracting foreign direct investment.[1] While Poland is in the early stages of its economic transformation, ranking 41st on the Global Competitive Index (Schwab, 2011), it is the 5th largest country in offshore outsourcing in the world and the first in Europe: Poland has 80 000 out of a total 350 000 jobs outsourced to Eastern Europe, and a significant number of them are in Wroclaw. These economic developments interacting with higher education policy reforms have driven change in the higher education landscape both nationally and locally.

In Wroclaw and elsewhere, universities and other higher education institutions (HEIs) can contribute to the human capital development in their region in four primary ways by:

- Widening access to and ensuring success in higher education for the existing youth and adult population of the region.
- Attracting talent to the region, including students and highly-qualified faculty and researchers.
- Producing graduates with knowledge and skills relevant to the region's economy.
- Contributing to the development of an economy that will employ graduates and retain and attract an educated population.

The World Bank (2004) and the OECD (Fulton *et al.*, 2007) have identified equity, quality, relevance and lifelong learning as major challenges for the Polish higher education sector. These challenges remain central to the evaluation of how Wroclaw's tertiary education system can best contribute to the region's social and economic development.

In this context, this chapter examines the following questions:

- Do the existing higher education providers in Wroclaw offer adequate learning and training opportunities to the local population in terms of age and socio-economic background?
- Are the existing higher education institutions and programmes in Wroclaw adequately aligned with the needs of the local economy? Do Wroclaw's HEIs provide high quality and relevant education?
- What lessons can be learned from international experience?

This chapter outlines the development of higher education in Poland and identifies key issues for Wroclaw from the perspective of human capital and skills development. It reviews the issues of equity in access to and success in higher education, identifying the limited financial, social and academic support for students as a challenge. It discusses the labour market relevance of Wroclaw's higher education. It identifies international examples that could inform Wroclaw and its higher education institutions in developing a more equitable and relevant tertiary education provision, highlighting the need for a stronger vocational higher education provision. It discusses the efforts by the city of Wroclaw and higher education institutions to enhance internationalisation and global branding. The chapter concludes with recommendations to the national government, regional and local authorities and universities. In Wroclaw and elsewhere in Poland, the surge in demand for higher education has been met primarily by the expansion of non-public provision based on tuition fees, which has posed challenges for both equity and quality. While graduate employability and the labour market relevance have traditionally played a limited role in the academically-oriented provision of many public universities, institutions are now taking steps to become more responsive. Over the coming decades, the higher education system in Wroclaw needs to respond more actively to a sharp decline in domestic student demand and changing economic realities. These changes call for widening participation to groups previously outside tertiary education, a greater emphasis on science and technology fields, a strengthened vocational education sector, expansion of lifelong learning opportunities and enhanced university-industry links.

2.1. Development of higher education

This section provides an overview of higher education in Poland and Wroclaw. It outlines the rapid growth of higher education through privatisation and fragmentation of provision. It reviews the geographical accessibility of higher education in Lower Silesia, advocating a region-wide assessment of current and planned capacity against anticipated student numbers, infrastructure-sharing arrangements between education providers and establishment of tertiary education centres that draw on a range of providers. It highlights the lack of tertiary education system diversity and argues that in order to increase the education attainment of the regional population and to ensure more relevant education provision, Poland, Lower Silesia and Wroclaw tertiary education needs a broader scope, with a stronger postsecondary vocational education sector that provides learning opportunities related to vocational and career-orientated education and training. Finally, this section highlights the gender issues in higher education, advocating for city-driven flagship programme to support women leadership in business, academia, arts and culture.

Transformation from an elite to mass system

Poland has made rapid progress from an elite to a mass higher education system in the past two decades. Student enrolment in higher education grew from little over 400 000 in the academic year 1990/1991 to more than 1.8 million in 2010/2011, the same number of students as in Germany, which has twice the population. The enrolment rate of 19-29 year olds increased from 15% in 1995 to over 40% in 2010/2011. The number of graduates in 2010 was 10% more than the number of all students in 1989 (Kwiek, 2011a; OECD, 2011a). The rapidly increasing student population has been catered to by state institutions and a large number of small non-public institutions that enrol one-third of all students (For data on the growth of Polish higher education see Table 2.1.)

Table 2.1. Growth of Polish higher education sector, 2000-11

Year	Number of higher education institutions	Number of students (including foreigners) in thousands	Number of teachers in higher education in thousands	Number of graduates
2000/2001	310	1 584.8	79.9	304.0
2005/2006	445	1 953.8	99.4	394.0
2009/2010	461	1 900.0	103.4	478.9
2010/2011	460	1 841.3	103.5	-

Source: Wroclaw's Regional Steering Committee (2011), *OECD Reviews of Higher Education in Regional and City Development. Wrocław, Poland* – Self-Evaluation Report, Wrocław.

As elsewhere in Poland, higher education participation in Lower Silesia has grown rapidly, concentrated in the metropolitan area of Wroclaw. The total number of students in Lower Silesia grew from 119 428 in 1999 to 160 207 in 2011, with a peak in 2009 (172 479). During the same period, the student enrolment in Wroclaw grew from 108 100 to 137 395 students, representing 22% of Wroclaw's population and 86% of all students in Lower Silesia (Figure 2.1).

At the same time, higher education attainment rates have grown in Lower Silesia, and particularly in Wroclaw, reaching the OECD average levels for the young generation. There is no robust data regarding the higher education attainment levels for Wroclaw's or Lower Silesia's younger age groups (25-34 years), but assumptions can be made on the basis of growing higher education enrolments and the national trend. In 2009, one person in five aged 15-64 years in Wroclaw held a higher education diploma, whereas in Lower Silesia only 17% of the working age population had completed higher education, two-third had upper secondary education and 16% lower secondary education. Since the higher education attainment level has improved among younger population, despite its steady increase over time, 2 percentage points between 2006 and 2009, the share of Lower Silesia's population with higher education remains below the national average.

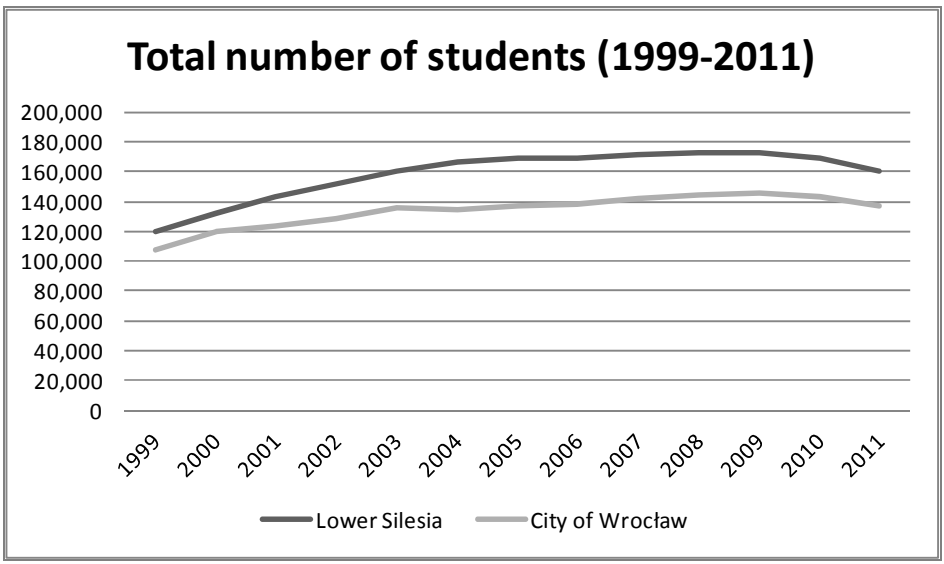
The growth of higher education participation in Poland and Wroclaw has, in recent years, begun to decline due to ageing demographics. The population in Poland and Wroclaw will fall steeply over the next decade, reducing the traditional age eligible population (18-24-olds) for higher education. The number of 19-year-olds will continue to decrease every year until 2020, and is estimated to be 361 473, half the peak youth population in 2002. By 2025, the total Polish student cohort is projected to decline by approximately 37% to 1.2 million students (EURYDICE, 2011). This corresponds to a reduction of almost 70 000 students, down to 107 000 total students in Lower Silesia or to 88 000 students in Wroclaw. (Figure 2.1)

The ageing demographics in Lower Silesia and Wroclaw will have a significant impact on the higher education system. Falling demand for higher education will increase competition between higher education institutions, and underline the need for closer institutional collaboration and possibly mergers. While public higher education institutions will absorb the student demand, the falling demand will eliminate institutions particularly in the non-public sector. The most pessimistic predictions assume the disappearance of up to 75% of non-public universities.[2]

At the same time, the ageing demographics will emphasise the need for widening access efforts and stronger lifelong learning activities. When the number of students within the traditional 18-24 age cohort declines,

Wroclaw's higher education institutions will need to cater to non-traditional learners, *e.g.* those groups of students who for financial or other reasons have not been able to attend higher education full time. Given the low activity rates and decreasing youth population, Wroclaw's higher education institutions will need to cater to older age groups.

Figure 2.1. Total number of HE students in Wroclaw and Lower Silesia, 1999-2011

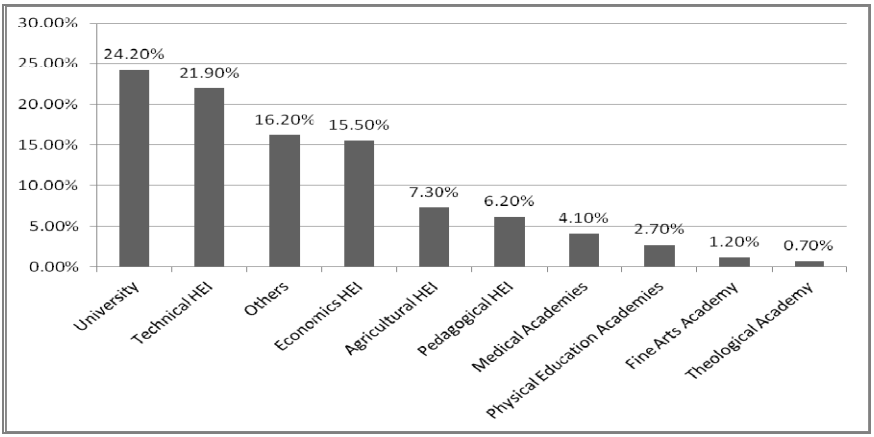


Source: Wroclaw's Regional Steering Committee (2011), OECD Reviews of Higher Education in Regional and City Development. Wrocław, Poland – Self-Evaluation Report, Wrocław.

Currently, Wroclaw's and Lower Silesia's higher education scene is fragmented with many small institutions, albeit dominated by two large state universities. There are 10 public and 20 non-public HEIs.[3] About 48% of all HE students in Wroclaw (or 40% in Lower Silesia) and 60% of students in public higher education are enrolled in the two large public universities: the University of Wroclaw (*Uniwersytet Wroclawski*) (35 000 students) and the Wroclaw University of Technology (*Politechnika Wroclawska*) (33 000). The set of 11 smaller public universities includes art academies (the Academy of Fine Arts in Wroclaw (*Akademia Sztuk Pieknych im. Eugeniusza Gepperta we Wroclawiu*), the Karol Lipinski Academy of Music in Wroclaw (*Akademia Muzyczna im. Karola Lipinskiego we Wroclawiu*), and a branch of Ludwik Solski State Drama School in Cracow (*Państwowa Wyższa Szkoła Teatralna im. Ludwika Solskiego*)) that enrol about 1% of the

total student population. Figure 2.2 shows the distribution of students in Wroclaw according to institutional type.

Figure 2.2. Students in tertiary education by school type in Wroclaw, 2010/2011 (%)



Source: Statistical Office in Wroclaw (Urząd Statystyczny we Wrocławiu) (2011*), Wroclaw in Figures: Living Conditions of the Population of Wroclaw, Stastitical* Office in Wroclaw (Urząd Statystyczny we Wrocławiu), Wrocław.

Non-public provision driving growth in HE

Increased higher education participation in Poland and Wroclaw has relied on non-public rather than public contribution. The Higher Education Law of 1990 permitted the introduction of tuition fees, which drove higher education expansion, facilitating the establishment of lower-status public and non-public institutions and fee-paying extra-mural students in public institutions. During the two decades since 1991, 350 mainly teaching-focused non-public institutions were established in Poland, while the number of state universities grew from 96 to 135. In 2011, 320 non-public institutions enrolled 580 000 students, 32% of the total enrolment in Poland. The higher education law of 1990 also permitted public universities to enrol additional or extra-mural students willing and able to pay a tuition fee in separate evening or weekend programmes.[4] As a result, many poorly funded state universities rely on fee-paying students who study part-time or weekends and represent about one-third of the total enrolment.

These developments have led to a situation in Wroclaw, and Poland in general, in which the part-time, fee-paying, weaker students cross-subsidise

financially better-off and academically stronger students who attend full-time, tax-based programmes at public universities (see also World Bank, 2004). The proportion of part-time students in Wroclaw's higher education students ranges from 13% to 82% (see Table 2.2). Part-time students comprise almost 40% of all students attending the 12 main higher education institutions in Wroclaw, with the lowest proportions in the Karol Lipinski Academy of Music (13%) and the Wroclaw University to Technology (17%) Wroclaw Medical University (*Uniwersytet Medyczny im. Piastów Śląskich we Wrocławiu*, WMU) has a low share of part-time students, 16%, but is a non-public institution). The percentage of part-time students reaches 80% or more in three institutions. While some HEIs specifically provide professional education targeted at working and/or mature students, part-time students constitute approximately 40% of students attending the University of Wroclaw. In an international context, this is unusual for a classic public university. In Wroclaw, and Poland in general, a considerable "burden of private contribution is borne by [only] part of the student population and not shared by all" (Herbst and Rok, 2011; OECD, 2012).

Geographical access to higher education

The geographical accessibility of tertiary education has improved in Poland and Lower Silesia due to the establishment of non-public universities and higher vocational education institutions in smaller cities and towns. The improved coverage has been a result of national policies that have allowed for the collection of tuition fees and have encouraged the expansion of higher vocational education institutions. The growth of the demand-led, more widely-dispersed non-public sector and higher vocational education sector (with four public institutions in Lower Silesia) has facilitated the participation of students in the region, who for personal, socio-economic or other reasons, are unable to travel to Wroclaw.

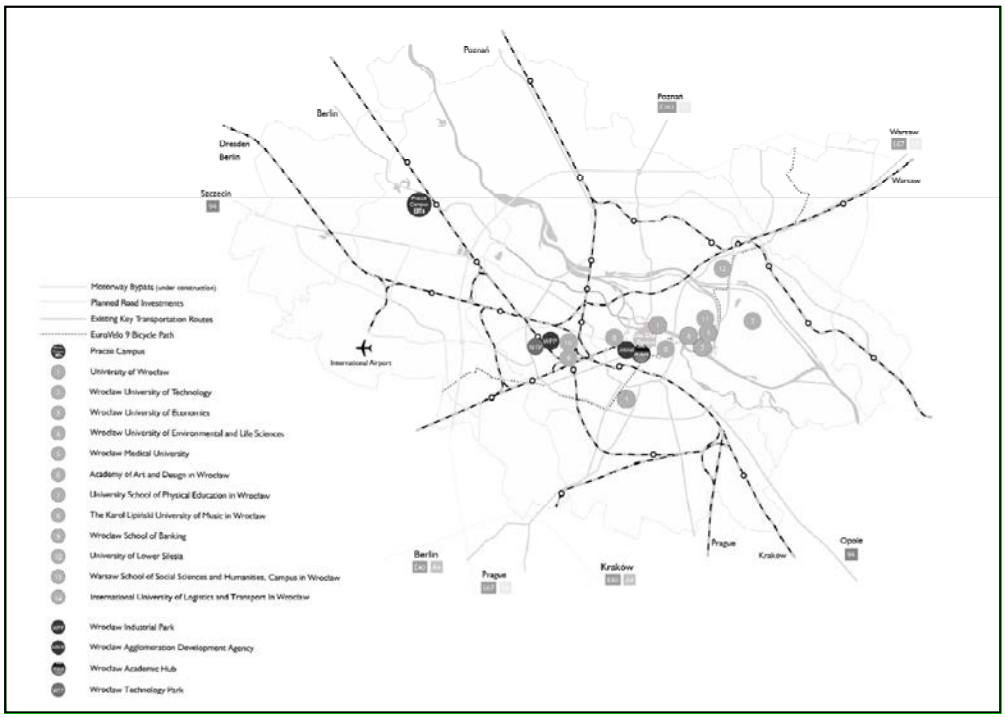
Despite the progress made, the geographic concentration of higher education in Wroclaw shows an imbalance in educational provision between the city and the wider region. Students in the wider region are primarily served by non-public, fee-paying institutions. With the exception of the Wroclaw University of Technology and the University of Economics (*Uniwersytet Ekonomiczny we Wrocławiu*, WUE), which have branch campuses outside Wroclaw, all public universities are located within the metropolitan area (see Figure 2.3).

Table 2.2. Wroclaw universities student data, 2011-12

	Total Students	No. Full-time Students	No. Part-time Students (fee-paying)	% Part-time Students	No. International Students	% International Students
UW - *University of Wroclaw*	34 621	20 748	13 873	40	628	1.81
WUT - *Wroclaw University of Technology*	32 929	27 361	5 568	17	678	2.06
WUELS - *Wroclaw University of Environmental and Life Science*	10 400	7 992	2 408	23	80	0.77
WUE – Wroclaw *University of Economics*	16 572	8 456	8 116	49	154	0.93
WMU - *Wroclaw Medical University*	5 582	4 270	885	16	427	7.65
AMKL – The *Karol Lipinski Academy of Music in Wroclaw*	582	506	76	13	10	1.72
ASP - *Academy of Art and Design*	1 094	607	487	45	17	1.55
AWF - *University School of Physical Education*	4 285	3 415	870	20	33	0.77
SWPS - *Warsaw School of Social Sciences and Humanities*	2 317	1 169	1 148	50	0	0.0
MWSLiT- International University of Logistics and Transport in Wroclaw	959	83	776	81	3	0.31
ULS - *University of Lower Silesia*	6 951	667	5 577	80	21	0.30
WSB - *Wroclaw School of Banking*	12 026	2 217	9 809	82	50	0.42

Source: Table based on data from Wroclaw Academic Hub (Wroclawskie Centrum Akademickie) (2012), Wroclaw Academic Hub, http://wah.wroc.pl.

Figure 2.3. Distribution of HEIs and knowledge hubs in Wroclaw region



Source: Wroclaw's Regional Steering Committee (2011), *OECD Reviews of Higher Education in Regional and City Development. Wrocław, Poland – Self-Evaluation Report, Wrocław*.

Despite the progress made, Lower Silesia has wide intraregional disparities in educational opportunities and labour market outcomes. Wroclaw is absorbing students from the region and Poland in general. No robust data is available on student origins and destinations, but it is estimated that Wroclaw's student population can be divided to three equally large groups: those who originate in Wroclaw, another third coming from the wider region and the rest from elsewhere in Poland. After graduation, most of Wroclaw's students stay in the city. Unemployment is significantly higher outside the Wroclaw city boundaries. In 2011, the unemployment rate ranged from 5.3% in Wroclaw to over 25% in some *powiats* in Lower Silesia.

Lower Silesia's higher education institutions could play a more active role in mitigating regional disparities. Higher education institutions can help Lower Silesia create a more diverse regional economy. They can boost regional economies by offering jobs for local people and by generating infrastructure spending. They can also train skilled labour and upskill and reskill the local population. Those who study in regional areas are usually more likely to stay in those areas, at least for some time, and contribute to regional sustainability.

Currently, tertiary education institutions and possibly also branch campuses, in the non-metropolitan areas in Lower Silesia and elsewhere in Poland are faced with diverse set of challenges: *i)* the increased costs associated with the smaller scale of regional university operations, *ii)* small student numbers, *iii)* reliance on academic staff whose primary employment is in Wroclaw, *iv)* a high proportion of students from a low socio-economic status background, *iv)* the difficulty of attracting students to study outside of the metropolitan area due to a limited range of programmes and lack of services, and *v)* ageing demographics that are likely to lead to a dramatic contraction of the tertiary education provision outside of metropolitan areas.

A fully effective tertiary education institution has a need for a critical mass of some thousands of students. The numbers of qualified applicants in Lower Silesia will dramatically decrease over the next decade. It is unrealistic to expect that the private-driven provision will survive in many regional towns without rationalisation, restructuring and mergers. Current providers will need to forge partnerships with local communities, collaborate with each other, and consider innovative solutions to regional provision in order to survive.

The changing situation offers an opportunity for authorities at national, regional and local levels to impact the design of tertiary education provision and R&D development activities that address particular local needs at the time. Authorities at different levels could consider conducting a region-wide assessment of current and planned capacity against anticipated student numbers and identify needs in terms of staff and infrastructure, taking into account related transport and student housing provision. In some cases there is a need to enhance infrastructure-sharing arrangements between different education providers. Support should be provided for tertiary education centres that draw on a range of providers, including both universities and vocational higher education institutions in order to ensure the broadest possible education provision, choice and programmes that take better account of regional industry and labour market needs.

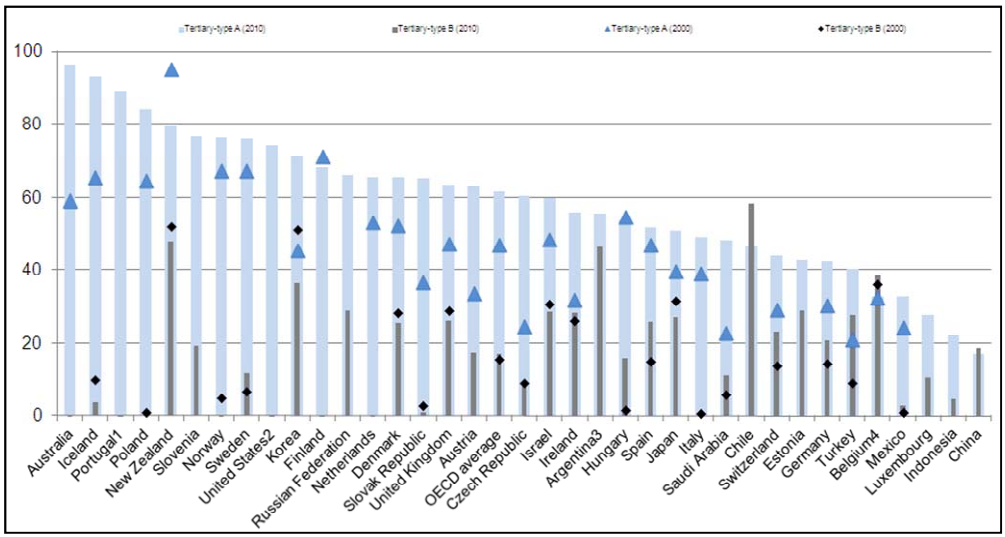
Broadening the scope of tertiary education sector

Vocational higher education institutions have been established in Poland and Lower Silesia, supported by local governments. Lower Silesia has four public vocational higher education institutions. During the OECD review visit in February 2012, limited reference was made to other education opportunities than universities with the exception of fine art and music.

The lack of recognition and visibility of Lower Silesia's vocational higher education sector is not surprising given the national situation. Despite the massification of higher education, Poland has a weakly developed vocational post-secondary education sector. OECD data show that Poland, along with the Slovak Republic and Iceland, has a smaller percentage of its younger age cohort attaining vocational education than other OECD countries (Figure 2.4). The overwhelming majority of students in Poland, almost 90%, attend tertiary-type A programmes and advanced programmes. According to Czarnik *et al.* (2011), 87% of upper secondary education students planned on further education, of which 70% prefer to attend university studies. In contrast, the proportion of students entering tertiary-type B programmes in Poland is almost negligible. This has implications for all students and for society, and especially for students with other aspirations or lower educational attainment levels. As a consequence, these students could effectively find themselves shut out of tertiary education.

The Polish National Qualifications Framework (NQF) is currently under preparation and will provide an overview of the qualifications pathway from secondary education with direct entry to BA or MA programmes, and onward progression to doctoral studies. It will be important to ensure that the NQF will, in addition to universities, also display other post-secondary institutions and that it will indicate alternative pathways to university education.

Figure 2.4. Entry rates into tertiary-type A and B education (2000 and 2010)



3. Entry rates may be overestimated as they include all students who entered the first year of a programme, not just those students who entered a tertiary-type A or B programme for the first time.

4. In 2010, the entry rates for tertiary-type A programmes include the entry rates for tertiary-type B programmes.

5. Year of reference 2009 instead of 2010.

6. Year of reference 2001 instead of 2000.

Source: OECD (2012), *Education at a Glance 2012: OECD Indicators*, OECD Publishing. doi: 10.1787/eag-2012-en.

The Polish situation contrasts with other jurisdictions, such as the US, Ireland, Germany, or the UK where community colleges, institutes of technology, polytechnics, *Fachhochschulen,* universities of applied sciences in Finland and the Netherlands or other "non-universities" provide students with a wide range of educational opportunities. These opportunities include post-secondary vocational education and training institutions which offer labour-market relevant skills for a particular occupation or industry. These institutions are often also more dispersed in the regions. Australia has several dual-sector universities which enable students to enrol on associate or sub-degree programmes, and then progress according to ability and interest.

Box 2.1. Australia: pathways and multi-sectoral campuses

In Australia, learners can, in principle, directly enter university undergraduate programmes via state government-owned Technical and Further Education (TAFE) institutions, which are major providers of postsecondary VET, often located outside metropolitan areas and closely aligned with the key employment sectors. Highest rates of transfer from TAFE programmes to university undergraduate studies happen from the "dual-sector universities" that provide both TAFE and university level programmes. Pathways are strongest when the sending and receiving institutions are close academically and geographically. Dual sector institutions also address the needs of the communities which are big enough to sustain one integrated tertiary institution but not big enough for separate vocational and higher education institutions. To address the skills needs, the Victoria government in Australia introduced in 2009 the Victorian Training Guarantee that entitles all Victorians to a government-subsidised place in vocational education and training. It supports an integrated tertiary education and training sector with a variety of pathways.

Australia has cross-sectoral and multi-stakeholder collaborations between universities and TAFE institutes. For example the **Gippsland Education Precinct (GEP)** is a multi-sectoral "institution" formed by a partnership between Monash University, Kurnai College, Apprenticeship Group Australia (formerly Gippsland Group Training), GippsTAFE and La Trobe City. It aims to improve access and equity in education and enhance employment opportunities through integrated learning pathways from Year 11 to TAFE diploma, university degree or PhD, with strong partnerships with business, industry and all levels of government. By co-locating all four education providers on a single site, the precinct helps widen access by enabling easier transition to apprenticeships, TAFE or university. As part of a AUD 20 million project, the Precinct offers state of the art facilities in all areas including IT, Science, Art, Library, Sport & Recreation and Technology – and students can utilise Monash facilities including laboratories, computers, student union and staff. The GEP provides the option to remain in Gippsland to live and work. Educational programmes are being developed in close consultation with local industry to help improve employability in the region and hence its sustainability.

Box 2.1. Australia: pathways and multi-sectoral campuses (continued)

The Deakin at Your Doorstep Programme began in 2010 with the aim to allow regional Victorians to study for a VET diploma or Associate Degree embedded in a university degree at local TAFE colleges. Some students go on to undertake full degree programmes, others will be better positioned to obtain employment. The two-year associate degree programme provides a pathway to higher education and addresses the systematic generational disadvantage suffered by rural populations and improves the attractiveness, accessibility and relevance of higher education to these young people and their families. The programme is funded under the DEEWR Diversity and Structural Adjustment Fund programme and delivered from Deakin University's Warnambool Campus. The associate degree will also be delivered through Deakin Learning Centres established at TAFE institutes including Sunraysia Institute's Swan Hill Campus, East Gippsland TAFE's Bairnsdale Campus and Chisholm Institute's Dandenong Campus in 2010 and at Mildura, Sale and Rosebud in 2011. The course, that uses interactive e-learning blended with face-to-face learning, provides an introduction to the foundations of a discipline or several disciplines, develops academic skills required for university study and generic employment related skills. The participating providers have selected the courses to be offered in consultation with each partner rural community in order to meet local skills shortages.

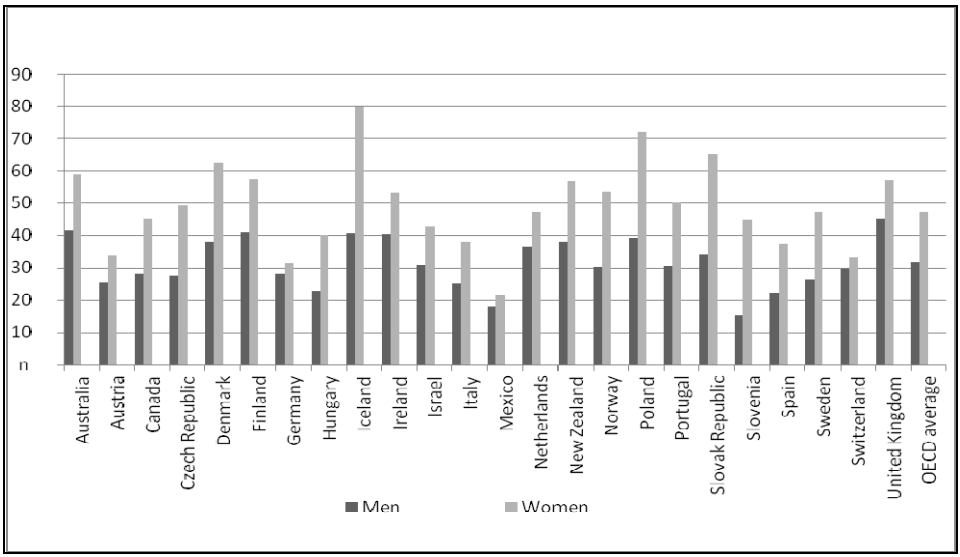
Source: OECD (2010a), Higher Education in Regional and City Development: State of Victoria, Australia, OECD Publishing, doi: 10.1787/9789264088979-en.

To increase the education attainment levels and to ensure more relevant education provision, Poland, Lower Silesia and Wroclaw need to continue their efforts to broaden the scope of tertiary education by creating a stronger post-secondary vocational education sector that can provide learning opportunities related to vocational, career-orientated education and training. It is necessary also to ensure fully-functioning pathways so that students can progress in their learning path.

Access and participation of women

Female participation in higher education in Poland has steadily increased in recent years. The percentage of women aged 20-29 who enrolled in tertiary education in 2010 is above that of men by almost 7 percentage points (26.6% of men and 33.4% of women in 2010). There is also a pronounced gap in completion rates. Among all men and women enrolled for the first time in tertiary-type A education, 72% of women graduate, compared to 39% of men in 2010 (OECD, 2012) (see Figure 2.5). Sector-based differences remain, with female underrepresentation in fields, such as technology and engineering (33% of graduates in 2003) (Fulton *et al.*, 2007).

Figure 2.5. Tertiary-type A graduation rates in 2009, by gender (first time graduates)



Note: Year of reference for Australia, Canada and France is 2009.

Source: OECD (2012), *Education at a Glance 2012: OECD Indicators*, OECD Publishing. doi: 10.1787/eag-2012-en.

Women in Poland remain underrepresented in academic leadership. Although the total percentage of women employed by universities in Poland was 53.2% in 2005, this figure is primarily due to the high representation of women among facility personnel (68.4%). While 40.9% of women were employed in academic positions, only 21.7% held the post of professor (Shmelova *et al.*, 2006).

Despite the favourable trend in women's participation in tertiary education, female representation in leadership positions in academia and in society will not improve without strong policy efforts. Experience from Sweden shows that policy interventions are required to improve female participation in academic leadership positions. Following policy incentives, over the period from 1990-2010, the percentage of women serving as vice-chancellors of Swedish higher education institutions (16 universities and 21 university colleges) rose from 14% to 38%, pro vice-chancellors from 19% to 60%, deans from 3% to 31%, and pro-deans from 0% to 43%. In 1990, none of the universities and five university colleges had female vice-rectors. In 2010, five universities and nine university colleges had female vice-rectors (Peterson, 2011).

While female students in Wroclaw HEIs have increased steadily, there is a lack of female representation in the top management of Wroclaw's universities. Given the current underrepresentation of women in the labour market in Poland and Lower Silesia, and relatively traditional, although rapidly changing gender roles, it is important to ensure that full advantage is taken of the forthcoming renewal of academic and leadership positions in order to improve the gender balance. The City of Wroclaw could also consider launching a city-driven flagship programme to support women leadership in business, academia, arts and culture, in the same way that it launched in 2010 the Academy of Young Scientists and Artists (AYSA) as Poland's first young scientists' academy.

The experiences from the University of Karlstad and the region of Värmland in Sweden could inform Wroclaw and its higher education institutions when they embark on designing efforts to address traditional gender roles in higher education and wider society, which to date seem to remain largely unrecognised.

Box 2.2. The Gender perspective in Värmland

Värmland is a region in central Sweden on the border with Norway, approximately 300 km west of Stockholm and 250 km north of Gothenburg. It has 274 000 inhabitants, with 80 000 people in the regional capital Karlstad. Major industries are pulp & paper, and steel and trade, including tourism and cultural events. The trade with Norway is important and a number of people from Värmland commute to work in Norway as part of a "growth corridor" between Oslo and Stockholm and Copenhagen.

There is a broad acknowledgement that Värmland's national and global positioning is constrained by traditional gender roles. Värmland is on a par with some of Sweden's most segregated municipalities when it comes to gender. Värmland has a long tradition of heavy, male-dominated industries where men have been more visible than women, particularly in traditional decision-making. The tradition that men stay and women leave the industrial communities has also been well-entrenched in the region. Although Swedish legislation actively supports equal opportunities, affirmative action in the form of priority access to employment based on gender has been negatively charged. Recognising the opportunity that the generation shift in industry can facilitate, by removing traditional, masculine "ritual culture" of Värmland, the region and its university (University of Karlstad) embarked on an affirmative action.

Box 2.2. The Gender perspective in Värmland (continued)

In the university education, priority admission has not proved effective in increasing the number of female students in male-dominated areas. Qualified women applicants have been admitted without priority due to the low number of applicants to technological programmes. Despite a steady increase in the number of women students in higher education, in technical fields and ICT the trend has been the reverse. The number of women beginners in engineering decreased by half since 2000, and their share of students there dropped from 26% to 19%. In Systems Science, the decrease was even bigger with a drop from 41% to 13%. Several gender-related projects were launched in 2004 to attract more women students to technical programmes and to facilitate their studies as part of the project "Wanted: Technologists". One project targeted secondary school students and offered teachers professional development in pedagogy. Another project ensured mentors for all women students in technology and engineering. The purpose was to develop the students' confidence in their career choice and to help them complete their studies. A third project focused on creating a supportive network for female students in engineering. Värmland's participation in the first round of OECD reviews of higher education in regional and city development had a strong focus on gender issues. The gender issues featured visibly throughout the review process, *e.g.* in the self-evaluation report, regional workshops and review visit. An interactive multi-stakeholder workshop "Imagine Värmland Providing Equal Opportunities to All – workshop on gender analysis" brought together key regional partners to design collaborative strategies to address this challenge.

Source : Varmland's Regional Steering Committee (2006), *Supporting the Contribution of Higher Education Institutions to Regional Development: Self-evaluation of the Värmland Region*, *Sweden*, *www.oecd.org/sweden/35993157.pdf.*

2.2. Increasing equity in access and progress to higher education

Despite the massification of higher education in Poland and Wroclaw, access to and progress in tertiary education remain concerns. Some studies suggest that access to tertiary education remains related to the socio-economic background of students and their families, depending on income and the educational level, but the lack of robust data on the socio-economic background of students at the system or institutional levels, or about students benefitting from student support programmes limit the possibility to evaluate the scope of this challenge. This section looks to the policy responses and practical interventions that reduce inequities in the access to and completion of tertiary education by focusing on three areas: i) schooling policies and institutional responses to facilitate transition to higher education, ii) affordability of education and financial assistance, iii) academic and social support for students. Higher education policy in Poland and Wroclaw higher education institutions have focused on increasing

participation with limited attention to equity, which is evident in the low level of public support for HE students and the lack of support mechanisms.

Schooling policies and institutional responses to facilitate transition to higher education

Challenges in widening access to higher education and higher education retention are often linked to the problems in the pre-university education system, which calls for policy attention at the national level. In Poland, successive improvements in the quality of school education will begin to address wider equity issues. In 2005-2006, the Polish government introduced a uniform new secondary school completion examination, which provided the basis for admission to most institutions of tertiary education. Learning outcomes at schools have improved due to school reform and target setting, which have in turn increased participation in higher education. The government has set a target to decrease the percentage of early school leavers to 4.5% and increase the proportion of people with a higher education qualification in the 30-34 age cohort to 45% (RP, 2011). Participation rates have improved: over 90% of 15-19 year olds are enrolled in secondary education, with a 90% retention rate among 17-year-olds. Reform of the school system, which included eliminating a secondary school track designed for students with lower performance expectations, has helped Poland make significant improvements. Students also attend longer at comprehensive lower secondary school, or gymnasium, before a vocational tracking decision is made. These changes account for the improvement in Poland's PISA scores. Between 2000 and 2009, Poland raised the performance of its "lowest-achieving students while maintaining the performance level among their highest-achieving students" (OECD, 2010b). (See also Chapter 1 for more on PISA results.)

Challenges in the pre-university education call for a strong role for local school authorities and in the case of Polish cities like Wroclaw. Local school authorities in Wroclaw have taken steps to improve the quality of school education. Wroclaw has been a national pioneer in introducing special scholarships for math and science students. Wroclaw has also reintroduced art and music into school curriculum as part of its long term commitment to cultural development (see Chapter 4). Investments in education have brought positive outcomes. In national rankings, Wroclaw has the best learning results at the primary education level, ranking third in lower secondary education and second in upper secondary education. The background report received from the city of Wroclaw also refers to local solutions in widening access to education among under-represented groups such as Roma, but gives no detailed information about these solutions.

There is also no information what arrangements have been put in place to address the needs of the children of the migrant population, which in addition to well-educated and well-remunerated expatriates includes migrants in low-skilled jobs.

While it is up to the school authorities to work towards improving the equity and quality of education, Wroclaw's higher education institutions can also reach out to local high schools to help improve the motivation and academic performance of students. Several programmes are already in place, mostly driven by individual institutions or even individual faculties. Long-standing collaboration exists between the science faculties of HEIs with Wroclaw's best-performing secondary schools, particularly with the High School No. 14 where students work with academic faculty on an extended curriculum, contributing to success in national competitions. The Wroclaw University of Technology has offered talented high school students introduction to algebra and mathematical analysis which are part of the first year studies in the university (Talent Project). WUT also runs the Academy of Young Explorers that offers popular scientific lectures to children aged 7-14. EIT+ has introduced the Humanitarium project that also aims to raise aspirations among children to study STEM fields.

At the same time institutional commitment and effort to raise aspirations among first generation students remain limited in Wroclaw's higher education institutions. Most activities focus on recruiting students, more specifically talented students, rather than building long term collaboration with schools to improve the quality of education and raise aspirations. Apart from collaboration with the best-performing schools, limited information is available on what specific efforts Wroclaw's higher education institutions are making to improve quality and retention at Lower Silesia's schools by training a new generation of teachers or providing further education opportunities to local teachers to help them address the needs of a more diverse student body. There are also many bottom-up initiatives where universities' faculties and departments recruit students, with the result that not only universities, but also their individual faculties, are in competition for best students. Given the competitive context of higher education, it is not surprising that collaborative efforts between higher education institutions remain limited, apart from the joint, two day event by Wroclaw's HEIs to attract secondary school students and teachers from Lower Silesia. This event has been running since in 2010.

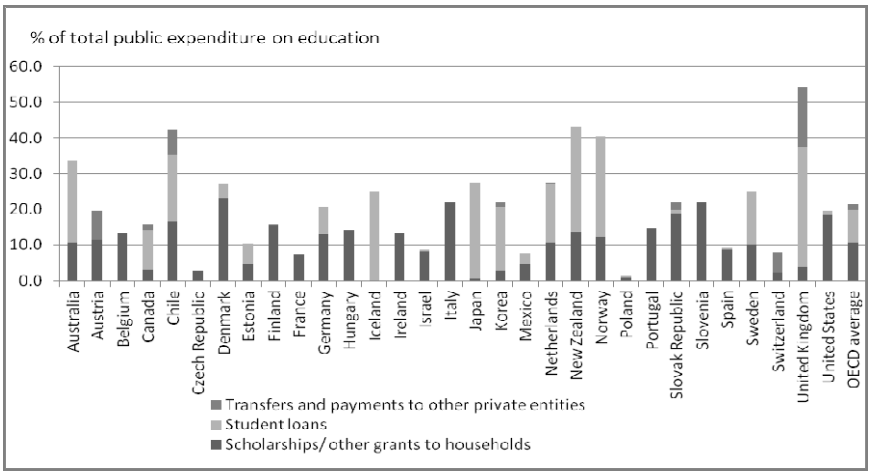
Furthermore, despite the commendable progress made at the national level, the continuing demarcation between vocational and academic tracks in the secondary education system, reinforced by socio-economic status, suggests that educational provision and labour market opportunities will continue to be stratified in Poland. To overcome this problem, the

government could consider two approaches: i) abolishing the tracking system in the secondary education and ii) expanding tertiary educational opportunities through a strategy of institutional diversification to meet a wide variety of skill needs and opportunities. In addition, pathways between all post-secondary education institutions should be opened to enable students to progress.

Affordability of education and financial assistance

Public support for higher education remains modest in Poland in international comparison. Figure 2.6 shows the breakdown of public subsidies for higher education in 2009 ("public subsidies" refer to student loans and scholarships, other grants to households as well as transfers and payments to other private elements). State support for HE studies in Poland consists of four elements: i) Grants which are awarded by HEIs on the basis of merit or need within limits specified in legislation, ii) Loans, iii) Tax benefits for parents/guardians of students, and iv) family allowance. The World Bank (2004) and OECD (2007) have criticised the lack of support and the limited scope of need-based grants.

Figure 2.6. Public subsidies for education in tertiary education (2009)



Source: OECD (2012), Education at a Glance 2012: OECD Indicators, OECD Publishing. doi: 10.1787/eag-2012-en.

NOTE: According to the Polish Science and Higher Education (Communication in December 2012) the figure does not refer to "public subsidies for higher education in 2009, but public transfers to individuals and private entities in involved in higher education, in percentage terms. This percentage is questionable."

About one-fifth of the student population in Poland and Wroclaw benefits from scholarships that tend to be relatively modest. In 2010, 23% of students in Poland and about 22% in Wroclaw received scholarships. In the academic year 2009/2010, altogether 30 910 scholarships were awarded to Wroclaw's higher education students, 37% on the basis of low income. Scholarships differ on the size across institutions, but tend to be modest, less than half of the minimum wage. (see Chapter 1 for more details). No information was provided on the size of the scholarships in Wroclaw's HEIs. The World Bank (2004) and OECD (2007) have cautioned about the irregularities in awarding the scholarships. While the current review did not look into the details it reiterates these concerns.

In 2009, 16% of students from less well-off families took out loans in Poland, with monthly instalment ranging from PLN 400 to 600. No information was available on the number of Wroclaw students who take repayable student loans, but given the national trend this is likely to be at a low level. The Ministry of Science and Higher Education has noted (written communication, December 2012) that the relatively limited supply of student loans is "caused by the lack of mass interest in the preferential system of support despite of its constant promotion by the government", which is the only limitation to the possibility of increasing the supply of student loans.

Government authorities in Poland have acknowledged the limitations in the student financial support system and have aimed to address these issues in the 2011 higher education law. The 2011 law has introduced a set of changes that are commendable and will help to address the equity needs in education. These changes include the following: i) changes to eligibility for student grants favouring financial need (60%) rather than simply merit (40%), increased effectiveness of the system of non-returnable financial aid for students and increase in the income threshold for assistance; ii) improved access to loans for persons in difficult financial situation, by making them fully or partly state guaranteed depending on family income; iii) introduction of the principle of equality between higher education institutions of public and non-public sector in their access to public subsidies, and iv) the right of the local governments to award scholarships.

Box 2.3. Higher education fees and public support to higher education students

In Poland, higher education students pay administrative (entrance and certification) fees with amounts updated annually by the minister of higher education. Previously only students in non-public institutions and part-time students in public institutions paid tuition fees, set by higher education institutions (Exemptions and reductions were possible on the basis of low economic status, health problems or excellent results). Full-time students in public HEIs paid fees only if they repeated a study course or examinations. The 2011 Higher Education Law has changed the situation: full-time students in public HEIs now pay tuition fees for the second/another full-time study programme (exemptions are possible when being qualified for a rector's scholarship for the best students). Students also pay for courses that exceed the ECTS limits set centrally (180 ECTS for first-cycle studies and 300 ECTS for uniform master studies). Students are allowed to enrol for free courses of up to 30 ECTS. HEIs can no longer charge for repeating examinations (a catalogue of free-of-charge administrative services has been introduced). The reform simplified the grant scheme. A maintenance grant, an accommodation grant and a meals grant were incorporated into a single social grant. The scholarship for academic and sporting achievements was replaced by a rector's scholarship for the best students.

State support for HE studies consists of four elements:

- GRANTS: Need-based grants are available for students with low personal/family income or disability, and merit-based grants for academic or sport achievements. In most cases, HEIs are responsible for the number of grants awarded within limits specified in legislation. The 2011 Law on Higher Education introduced changes to eligibility for student grants favouring financial need over merit, and increasing the effectiveness of the system of non-returnable financial aid for students. It involves shifting the balance from 50%-50% to 60%-40%, whereby financial need becomes the greater portion. It has also raised the income threshold for assistance by 30%. The minimum and maximum amount of income entitling to apply for the need-based social scholarship for low-income students increased by 30% in 2011, i.e. up to PLN 456.3 (minimum) to PLN 782.6 (maximum) per person. In the academic year 2012/2013, these amounts were increased to PLN 592.8 and PLN 850.2, respectively. The exact threshold is set by individual higher education institutions (rector in consultation with the student self-government).

- LOANS: Loans of 6 000 a year may be taken out in a cycle for those with a personal income below PLN 2 500 a month (2 100 net in 2010). In the academic year 2011/2012, 11% of students enrolled in higher education institutions took out loans. The 2011 Law on Higher Education has made loans for persons in difficult financial situations more accessible. Loans taken by students are guaranteed by the state: 100% guarantee when the family income equals up to PLN 600 per person and for students deprived of parental care; 70% guarantee when family income equals from PLN 601 to PLN 1 000 per person (as of 2010/11).

Box 2.3. Higher education fees and public support to higher education students (continued)

- TAX BENEFITS: Tax benefits for parents/guardians of students in the form of tax relief of PLN 1 112.04 per child per year in 2009, if families receive a care allowance or other benefits and/or the student did not earn a taxable income (including capital gains) exceeding PLN 3 089.

- FAMILY ALLOWANCE: Family allowance based on low income of parents or disability of a student.

Source: EURYDICE (2011), "Modernisation of Higher Education in Europe: Funding and the Social Dimension 2011," Education, Audiovisual & Culture Executive Age ncy, European Commission, *http://eacea.ec.europa.eu/education/eurydice/documents/thematic_reports/131EN.pdf*. Data updated by the Polish Ministry of Science and Higher Education (written communication Dec 2012)

While it is too early to evaluate the outcomes of the changes brought about by the new higher education law, they may expedite and extend participation to new socio-economic groups in Poland. The government should carefully monitor the equity impacts of the current student financial support system. Overall the student financial support system remains modest and does not adequately assist those students with financial needs. The grants are not sufficient to cover the realistic costs of living and the supply of loans remains limited.

In international comparison, the financial support in Poland for HE students remains weak. In the US, mass higher education is publicly-funded and elite education is privately-funded. For example in Australia or the UK, the income-contingent student loan is repayable on income earned over a threshold. The EU is also currently considering a student loan scheme.

An important element of equitable provision of tertiary education is the financial assistance provided to disadvantaged students while progress has been made e.g. in the case of disabled students. On the basis of Poland's Law on Higher Education public and non-public higher education institutions currently receive subsidies for i) the tasks related to the creation of conditions enabling full participation of disabled students and doctoral students in the educational process and ii) the tasks related to non-reimbursable financial support for students and doctoral students. Polish government could consider whether financial conditions exist to expand the current student support system, by examining systems that are based on

means-tested grants complemented with a universal, income-contingent loan scheme, with fee waivers for students with the greatest need.

Academic and social support for students

In Poland and Wroclaw, performance in the secondary school-leaving examination determines whether the student can be selected for enrolment in a "regular" public university academic programme, which does not carry any tuition fee. Full-time study programmes in traditional public metropolitan universities are attended primarily by students of higher socio-economic status, who perform best in secondary school examinations. These are the highest-performing students, who are selected through a competitive process with strict selection criteria. They come from affluent or middle class-aspirant families with high(er) education and professional backgrounds, usually from large cities or towns. They usually attend on a full-time basis and do not pay fees. In contrast, lower socio-economic and/or academically weaker students attend metropolitan or regional universities usually on a part-time schedule (evenings or weekend) or study in non-public, fee-paying institutions.

The large proportion of part-time, fee-paying students in Wroclaw may pose an equity challenge associated with different academic abilities and personal circumstances of students (see Table 2.2). As noted by the World Bank (2004) and the OECD (Fulton *et al.*, 2007), students attending part-time, either in the evening or at weekend, are more likely to be the first in their family to attend higher education, to come from families without support systems, to be working while studying and/or to be academically weaker. Both the World Bank and the OECD reported an absence of "parity of esteem" between the two student cohorts, evidenced by uneven quality in the teaching and learning environment. During the OECD review in February 2012, some interviewees acknowledged that many part-time students were unable "to accept the body of knowledge that the university can offer".

Currently, Wroclaw's higher education institutions are beginning to provide academic and social support for students, which has previously been available in only a few institutions. The Wroclaw University of Technology's department of fundamental studies offers one-year preparatory studies during which the students can decide their future direction. The Wroclaw University of Economics provides academic support for students, by tailoring curriculum for Master's students to meet their needs and competencies, and by providing additional courses in maths and physics at the initial stage of studies. Teaching staff has been encouraged to

take part in didactic training. In general, however, the efforts in this domain require strengthening.

The extent of the need for academic and social support is difficult to estimate due to the lack of robust data and student tracking. There is no data available on student progression, learning outcomes or graduation rates according to programme of study, and no formal tracking of student performance over their complete study time or beyond. There are "no longitudinal, comprehensive studies on the labour market performance of the graduates, and neither the public statistics, nor the universities track the careers of alumni in a way that would permit the evaluation of the contribution of the received education to the success in life". (Herbst and Rok, 2011)

The new Higher Education Law of 2011 requires that Wroclaw's higher education institutions create more robust quality assurance mechanisms. In developing their QA mechanisms, HEIs in Wroclaw could take steps to monitor not only student satisfaction, but also the total student experience. Student satisfaction surveys are often used as a mechanism to gain feedback on the learning experience within the classroom, whereas the total student experience looks broadly at the entire experience of students and the services provided by HEIs. The total student experience is used to assess the quality of higher education, encompassing teaching and learning, curriculum, student life, advising and mentoring. It is widely recognised that the quality of the total student experience is closely connected with enhancing student performance, including reduction of dropout rates and improving academic standards (Chickering, 1969; Chickering and Reisser, 1993).

International experiences in widening access and improving success in higher education

A comprehensive approach to widening access to education and improving success is provided by Victoria University in Australia, whose catchment area is one of the fastest growing but poorest areas of Melbourne. The university serves a student population with a higher-than-average representation of students from low socio-economic and non-English speaking backgrounds. Commended by the Australian Universities Quality Agency (AUQA) for its success in building effective relationships with schools, Victoria University's broad equity and diversity strategy comprises a wide range of student equity initiatives, such as: i) the investigation of secondary school students' educational aspirations, ii) strategies to address student finances and financial literacy; iii) provision of access to IT resources for students from lower socio-economic backgrounds, iv)

provision of education for students with a disability, v) recognition of the cultural diversity of students, vi) provision of programmes designed to increase the participation of students from equity groups through Access and Equity Scholarships and vii) a Portfolio Partnership Programme that provides an alternative pathway to university for capable students that do not have a sufficiently competitive score to enter higher education.

Victoria University has a strong commitment to collaboration with schools, local government and other stakeholders. Its Access and Success programme involves both school and community partners in designing and delivering interventions to increase their relevance to particular contexts. The Access and Success programme builds relationships between schools, students and mentors, who can be university students or prominent community figures. It involves early, long-term and sustained interventions. Some projects take a cohort-based approach to changing student attitudes and peer culture in relation to education in order to improve achievement and aspirations for future education and employment. (See Box 2.4)

Box 2.4. Victoria University's Access and Success programme

Victoria University is a dual sector institution that provides both higher education, and technical and further education. It has over 50 000 local and international students enrolled at campuses across the city-centre and western suburbs of Melbourne, which have below-average educational outcomes. The Access and Success programme works with schools in the west of Melbourne to improve access to, and successful participation in, post-compulsory education. It has established collaborative teaching and research partnerships with schools and has implemented programmes across more than 70 different sites. It comprises different "arms", which involve university staff and students working in schools (Learning Enrichment), professional development of teachers via participation in post-graduate education (Teacher Leadership), working with senior secondary students to support their aspirations and provide information on pathways to tertiary education and employment (Youth Access), enhancing students' educational engagement through school-based programmes with community partners (Schools Plus) and developing and disseminating research (Access and Success Research).

"Learning Enrichment" involves learning teams of school and university staff and students. Continuous university presence in schools improves student achievement and raises aspirations. Pre-service teachers work with in-service teachers and university researchers to design action research projects that investigate student disengagement and participate as literacy mentors in a whole-school literacy intervention, while also researching the impacts of this intervention on school staff. "Teacher Leadership" aims to engage teachers and principals in professional learning that increases teaching capacity in the schools.

Box 2.4. Victoria University's Access and Success programme (continued)

This has involved delivering professional development that articulates with the university graduate certificate or masters of education programmes. Research partnerships are based on participatory methodologies, which give teachers and principals control over the research agenda in their schools.

Schools Plus builds school-community connections and increases the engagement of students and families with education and community life. The Kinda Kinder programme (launched in 2005) seeks to address low levels of pre-school participation by engaging with parents and children. Children attend once a week with a parent or a caregiver for a one hour free programme in public libraries, other community settings and schools. Pre-service early childhood teachers provide education through storytelling and other play activities, while supporting parents to develop social networks and familiarisation with formal education and community services. In 2009, Kinda Kinder operated in 19 sites.

A new generation of adult learners including parents and grandparents are learning along with the children, the pre-service teachers and university staff in the Kinda Kinder setting. Kinda College has been developed with the vocational higher education part of the university and will offer parents the opportunity to gain further education accreditation for their skills. A range of quantitative and qualitative research methodologies are used to evaluate and inform collaborations with school and community partners and to track the impact of the projects. This investment in research and the emphasis on capacity building through cross-sector and cross-agency partnerships has increased the reach and sustainability of the project.

Source: OECD (2010a), Higher Education in Regional and City Development: State of Victoria, Australia 2010, OECD Publishing. doi: 10.1787/9789264088979-en

Developing a robust and supportive learning environment would help solidify Wroclaw's claim to be a City of Knowledge. Higher education system actors in Lower Silesia and Wroclaw could consider introducing formalised initiatives embedded within the universities' policies to ensure equity in access to and progress in higher education. The formalised initiatives could be undertaken in tandem and on a collaborative basis between the universities in order to share best practice.

Box 2.5 presents international examples that can inform Wroclaw and its higher education institutions how a higher education system, groups of institutions or individual institutions can develop programmes and support systems that are targeted at students who, because of work or family commitments, can only attend classes in the evening or weekend, or may be

academically weaker. These initiatives can help: i) facilitate access, ii) provide ladders-of-opportunity or iii) provide support systems or mentoring to ensure all students can successfully progress through their programme of study.

Box 2.5. Examples of educational pathway and support programmes in UK and Ireland

Accreditation of Prior Learning (APEL) in the UK: The APEL process enables people of all ages and backgrounds, who do not meet the normal entry requirements, to receive formal recognition for skills and knowledge acquired outside the formal education setting, either in work or throughout life. It is especially advantageous to socially-disadvantaged and mature students who for various reasons may not have the requisite examination scores required for entry to university or people who, because of geographical location, family commitments or other personal reasons, have been unable to undertake formal educational programmes. APEL accreditation focuses on the outcomes of the learning rather than on the experience of learning, in other words students are assessed on what they know rather than the number of years in a formal classroom environment.

Access Support Programme in Ireland: A variety of different types of support programmes can be provided to assist students adjusting successfully to university, and gaining maximum benefit from their time by providing a range of post-entry supports. This is because university is a different experience from secondary school; there is a greater emphasis on personal responsibility and less supervision. Support programmes may include specialist mentoring, additional coaching, student counselling or "buddy systems" which involve peer-mentoring. Specialist programmes can also be developed for mature students to help them integrate into university life.

Dublin Institute of Technology (DIT) provides a wide range of initiatives aimed at helping students integrate well into the university environment. The aim is to help students improve their learning skills and realise their potential in relation to their course of study. The Study Skills Development Workshops aim to enhance the modules on study and examination skills, learning resources, and career planning. Additional academic classes are provided for students who feel they might need extra help. The Peer Mentoring programme involves a "buddy", who is an older student. A student in second, third or fourth year, he or she is able to help first years with information or any questions they have about college life. Suitably qualified older students may also provide tutoring support for other students, based upon their level of academic support required.

Box 2.5. Examples of educational pathway and support programmes in UK and Ireland (continued)

Accumulation of Credits and Certification of Subjects (ACCS) in Ireland: Credit systems facilitate a "ladders-of-opportunity" approach whereby students can undertake a programme of study over-time by accumulating credits over time. Depending upon circumstances, a student may choose to study one, two or three subjects etc at a time. ACCS is designed to facilitate students wishing to follow courses on a part-time basis, as well as those taking evening courses. ACCS also facilitates students who may, because of work or family reasons, need to move from one institution to another or to another part of the country. ACCS can also facilitate students who change their mind about their programme of study. The system works on the basis of trust and shared understanding of quality, whereby an institution recognises the credits accumulated at another institution. First developed and elaborated in North America, credit accumulation processes remain more extensively used there than in other regions. The Bologna Process has embraced credit transfer, using the European Credit Transfer System (ECTS) as a way of encouraging greater mobility, including involvement on Erasmus programmes. Under the system, each taught programme year accounts for 60 credits, and thus 240 credits for a 4 year Bachelor's degree.

Source: UK Centre for Materials Education (2012), Accreditation of Prior and Experiential Learning, *www.materials.ac.uk/resources/library/apelintro.asp.;* University of East London (2012), Programme Summary for Foundation Degree Professional Development, *www.uel.ac.uk/undergraduate/programmes/profdevelopment.htm.;* Dublin Institute of Technology (2008), "Access Service: A Link to Success," Community Links Programme, *www.communitylinks.ie/uploads/media/DIT_Access_booklet_2008_content.pdf.;* Athione Institute of Technology (2009), Accumulation of Credits and Certification of Subjects (ACCS), *www.ait.ie/informationforfuturestudents/undergraduatestudents/accs/;* Queen's University Belfast (2011), "Section 11: Credit Accumulation and Transfer Scheme (CATS) and Accreditation of Prior Learning," Quality Assurance and Partnerships, *www.qub.ac.uk/directorates/AcademicStudentAffairs/FileStore/Filetoupload,53840,en.pdf.*

2.3. Relevance of higher education

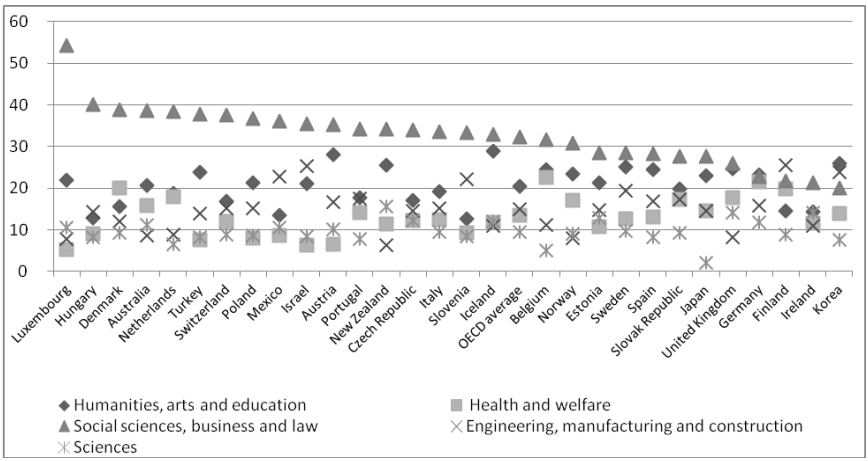
This section reviews the labour market relevance of the higher education provision in Wroclaw. It identifies the mismatch between supply and demand, as well as the lack of formalised programmes or modules which ensure soft skills, career readiness and employability, and limited dialogue or consultation with external stakeholders as key issues. It outlines the current efforts made in lifelong learning which, given the ageing demographics and lower educational levels of older age groups, remain limited. It argues for collaborative efforts in lifelong learning and allowing access to tertiary education on the basis of prior learning. Finally, it

discusses the efforts by the city of Wroclaw and higher education institutions to enhance internationalisation and global branding of Wroclaw.

Mismatch in supply and demand

In Poland and Wroclaw, as in most OECD countries, the majority of students choose tertiary programmes in the fields of social sciences, business and law. In the OECD area, only Finland and Korea diverge from this trend (OECD, 2012) (Figure 2.7). HEIs in Wroclaw, especially non-public institutions, have a predominance of social science and business programmes, with low student numbers in natural sciences, and arts and humanities. The two main public universities, Wroclaw University and Wroclaw University of Technology, cover the breadth of disciplines, with Wroclaw University of Technology concentrating on engineering and technology. Data provided to the OECD Review Team shows that most students in Wroclaw study economic and administrative courses (23%), social sciences (13.9%), teaching (12%), the humanities (8.8%), engineering and technical fields (6.8%), medicine (5.8%), information technology (4.9%), services (3.7%), legal studies (3.1%) and environmental protection (1.4%).

Figure 2.7. Distribution of new entrants into tertiary programmes, by field of education (2010)



1. Advanced research programmes are excluded for Belgium, Finland, Germany, Ireland, Italy, the Netherlands, Poland and Spain.
2. Tertiary-type B programmes are excluded for Australia.

Source: OECD (2012), *Education at a Glance 2012: OECD Indicators*, OECD Publishing. doi: 10.1787/eag-2012-en.

As in many other countries, there is a mismatch in Poland between student preferences for academic subjects and employability. In contrast to the Polish government's preference that more students should choose STEM subjects, most students feel they have made the correct choice, with 80% expecting "to find employment in the line of their studies" (Czarnik *et al.*, 2011). In reality, however, Polish graduates with qualifications in the economy and administration (more than a third) and pedagogy, followed by social sciences and the humanities, have the highest unemployment levels (Table 2.3).

Table 2.3. HE Courses most frequently completed by women and men generally (study of population), and among the registered unemployed (study of the unemployed), 2010

Total Population			Registered Unemployed
Women	**Men**	**Total**	
Economics & administration 32%	Economics & administration 28%	Economics & administration 30%	Economics & administration 35%
Pedagogy 22%	Technical & engineering 16%	Pedagogy 16%	Pedagogy 17%
Humanities 11%	IT 7%	Humanities 9%	Social 8%
Medical 8%	Pedagogy 8%	Technical & engineering 8%	Humanities 7%
Social 7%	Humanities 7%	Social 7%	IT 5%
Biological 3%	Social 7%	Medical 6%	Services for people 5%
Legal 3%	Architecture & construction 5%	IT 4%	Medical 4%
Services for people 3%	Production & processing 4%	Legal 4%	Architecture & construction 3%
Mathematics & statistics 3%	Legal 4%	Architecture & construction 3%	Agriculture, forestry & fishery 3%
Agriculture, forestry & fishery 3%	Medical 4%	Biological 3%	Technical & engineering 3%

Source: Czarnik et al,. (2011), *Study of Human Capital in Poland*, Polska Agencja Rozwoju Przedsiębiorczości/Polish Agency for Enterprise Development, Warsaw.

Polish employer groups have emphasised the lack of a sufficient number of qualified graduates in key fields. 17% of employers said they were looking for employees in three broad categories (Czarnik *et al.*, 2011): Skilled workers (drivers and mobile plan operators; construction workers; metal, machinery and related trade workers), professionals (sales professionals; health professionals; science and engineering professionals; application programmers; legal, social and cultural professionals; teachers);

and service workers (salespeople, cooks, waiters, hairdressers and call centre employees).

Evidence shows that job satisfaction is highest amongst those who have the right qualifications (education/training) combined with regular employment opportunities (Kwiatkowska-Ciotucha and Zaluska, 2006). While there may be limitations to channelling student choice towards specific disciplines or employment fields, much more could be done to provide pre-university counselling, enhanced employability skill training while at university and career guidance for graduates.

Labour market links

The 2011 Law on Higher Education refers to the need for higher education to directly align itself with the needs of society and the economy, and to ensure students are prepared accordingly. Thus, the higher education curriculum at all levels should incorporate new learning strategies: team work, problem-based learning, communication and other soft skills. Additionally, internships and work-based learning should be embedded in all levels of educational programmes.

The new legal requirements are changing many of Wroclaw's higher education institutions that have often not focused on developing transferable and "soft skills" among students. Business leaders who spoke with the OECD Review Team identified leadership skills and the ability to manage teams as key issues. Some specifically mentioned the need for Master's students with competence to undertake "back-office" functions. These perceptions are in line with the results of a survey of graduate recruiters in Poland who emphasised the importance of teamwork (67%), followed by sector-specific skills, communication skills, computer literacy, adaptability to new situations, first-class ability in reading/writing, and analytical and problem-solving skills (all 58%-62%) (Gallup, 2010). The business leaders stressed that HEIs could better prepare students for employment if study programmes incorporated sector-specific work placement (29%) or other forms of practical experience (32%) as a core element, or courses were more relevant (21%) or better post-graduation support was available (13%). 73% of Polish employers said graduates with a Master's qualification were the most employable (Gallup, 2010).

The city of Wroclaw, spurred by industry demand, has responded to the industry needs by helping the higher education institutions to introduce the "Wroclaw Graduate Model" with competence-based curricula, two years before the National Qualifications Framework for Higher Education was in force (See Box 2.6). There are also student-driven initiatives that focus on developing transferable soft skills.

Box 2.6. The Wroclaw Graduate Model

The Wroclaw Graduate Model is a Wroclaw-developed training that supports the shift towards competence-based university education. The model was developed as pilot in the academic year 2010/2011, two years before the National Qualification Framework came to force, in response to needs of the business services sector. The Wroclaw Graduate Model is based on a strong partnership between business actors and HEIs, where industry is closely connected in the design and delivery of the training as well as the selection of the students.

The HEI manages a recruitment process for a four-module training that targets Masters-level students. The recruitment method ensures that a diverse range of students representing different academic tracks, will take part in the training. The selection process is supported by industry partners, who appoint their specialists to the selection panels, adding the labour market perspective. Recruitment process is undertaken in English to guarantee a good language command (four modules are in English). Businesses have decisive powers in recruitment of trainers and class content in each of four modules. The city of Wroclaw provides funding to cover the cost of 50 students. In the academic year 2011/2012, the training included students of engineering, arts, and business from three HEIs that worked together with service sector businesses, *e.g.* major computer games producers and members of CreativeWro cluster.

The Wroclaw Graduate model is a targeted, scalable instrument designed to support HEI in the transformation towards qualification-based model of tertiary education. At the same time it strengthens partnerships with local business services sector. Since 2010, four HEIs have used the model to develop the education offer.

Source : Wroclaw's Regional Steering Committee (2011), *OECD Reviews of Higher Education in Regional and City Development. Wroclaw, Poland – Self-Evaluation Report*, Wrocław.

The labour market links of Wroclaw universities have recently improved but still require strengthening. During the OECD review visit the higher education institutions provided limited evidence of having modified the programme portfolio to reflect wider engagement with the outside world or the changing socio-economic profile of Lower Silesia. In general most students receive limited preparation for work at either undergraduate or postgraduate level. While all higher education institutions are now building their graduate monitoring systems, there is little information aligning educational provision with the labour market or career opportunities. Universities had not actively responded to the requirements of the higher education law to integrate industry in the design and development of study

programmes. There appears to be limited dialogue or consultation with external stakeholders prior to programme development or embedded within the quality assurance review process of programme to ensure the curriculum reflects continuing external as well as academic requirements. Business and community leaders and students in Wroclaw perceived the academy as generally unresponsive to the dynamics or needs of the labour market, business or innovation environment. Business and community leaders were also concerned about the capability of research students, and especially PhD students, to fully appreciate or adopt an entrepreneurial approach to their research. They also note that research students should develop better knowledge and understanding of intellectual property rights, and the commercialisation of research into new products and services. All these aspects confirm the conclusions of the World Bank (2004) and OECD (Fulton *et al.*, 2007) that described Polish universities as "relatively inward looking" and showing "little interest in either the labour market or the business and innovation environment".

Despite these concerns, it is clear that the higher education institutions are in process of creating more proactive links with the labour market. Some examples of promising initiatives undertaken in Wroclaw are identified in Box 2.7. While commendable in their own right, these efforts remain small in scale and with limited consistency across the HEIs and even within a single institution.

Box 2.7. Employability and career support

Internships organised by students: A small company, based in the Wroclaw Technology Park, was established by graduates from the University of Wroclaw and Wroclaw University of Economics as an intermediary between the HEIs, students and SMEs. The company matches individual students or groups of students with an SME. The students learn business skills and to work in a business/entrepreneurial environment while the company has people to carry out work that it would otherwise find difficult to undertake. The period of time can vary between 1-3 months, and is usually in the IT or marketing fields. On completion of the project, the company may be offer the student employment. The current scheme is not part of any structured training or curriculum, or recognised by the university.

Box 2.7. Employability and career support (continued)

Career Office: All universities have established career offices but these appear small in size in view of the needs of the students. For example The Wroclaw University's Careers Office is a new small scale initiative, funded primarily with external project funding; of the 11 people currently employed, the core staff is 3.5 people. It provides career advice, extra-curricular internship opportunities. It actively participates in the Wroclaw "Graduate of Wroclaw" project in collaboration with other universities, the city and employers. Its role is to help prepare students for employment in particular fields and has been operating since 1998. Career advice operates in tandem with the other Wroclaw universities, and is part of a large Mentoring Project. In the Wroclaw University of Technology, part of the career services work is undertaken by a student-driven service that receives funding from the university.

"Your knowledge. Your company" (*Twoja wiedza. Twoja firma.*): The project is managed and run by a team of young professionals who work is various fields of expertise and across different academic and non-academic institutions. The programme offers 30 hours training on all BA, MA and PhD level programmes with the objective of creating "employers not just employees". Students will learn the fundamentals of business, equip students with skills to create and run their own businesses. The shape of the programme may be different in each of the participating universities, but there is a shared purpose. A similar initiative is being developed by the International University of Logistics and Transport in Wroclaw, a niche institution catering for students interested in upgrading skills or acquiring practical skills. All students have an internship at a company.

Stakeholder Involvement in curriculum development. As part of the Wroclaw graduate Model, the University of Environment and Life Sciences in collaboration with the School of Banking and Academy of Fine is developing an initiative to embed labour market experience in some programmes. At present, approximately 200 students are involved, learning problem solving, numerical and business English skills, plus effective communication to enhance their employability. Courses will be offered in a series of 4 blocks totalling 144 hours on the weekends with company involvement at all stages: curriculum, recruitment of students and teaching.

Source: Wroclaw University of Economics (Uniwersytet Ekonomiczny we Wrocławiu) (2012), "Kuznia Kadr" (Forging Cadres), presentation at OECD Review Visit, Wroclaw, 22 February 2012.; P. Wrzecioniarz (2012), "Universities and Businesses Together," PowerPoint presented at OECD Review Visit, Wroclaw, 22 February 2012.; University of Wroclaw (Uniwersytet Wroclawski) (2012), "Career Service University of Wroclaw," PowerPoint presented at OECD Review Visit, Wroclaw, 21 February 2012.

The Wroclaw University of Economics has taken a holistic approach to becoming more "business-facing" by taking steps to strengthen institutional management, to improve graduate learning and labour market outcomes, and to strengthen the quality and local relevance of its education and research.

Box 2.8. Wroclaw University of Economics: Holistic approach to quality and relevance of education

Wroclaw University of Economics' (*Uniwersytet Ekonomiczny we Wrocławiu*, WUE) Kúznia Kadr project aims to strengthen institutional management, to improve graduate learning and labour market outcomes, and to strengthen the quality and local relevance of its education and research. In order to improve its management capacity, WUE has introduced the Integrated Management System (IMS) that covers financial, HR and real estate management. WUE has also systematically provided training to staff in managerial positions in areas such as in negotiations skills.

WUE has taken steps to modernise its education provision and modes of delivery by developing new curricula, programmes and teaching methods such as e-learning. This work has been based on an in-depth inventory of education provision, research activities, organisational units and staff competencies. New curricula have been introduced, for example, for the Master in Business Analytics and Project Management. To cater international as well as local students, WUE has launched new majors in financial management, corporate finance and business administration taught in English. WUE provides academic support for students by tailoring Master's students' curriculum to meet their needs and competencies, and by providing additional courses in maths and physics at the initial stage of studies. Teaching staff has been encouraged to take part in didactic training and to build their international competencies. To strengthen its internationalisation, WUE supports international study visits and also funds posts for visiting professors for up to two months.

The WUE gives special attention to graduate employability. The Professional Orientation Office has been strengthened. WUE graduates receive personal support to access the labour market (professional testing of skills, qualifications and competences, preparation for job application, training in job search, coaching and mentoring). WUE has strengthened its industry links by inviting industry representatives as visiting staff and guest lecturers, introducing practical labour market aspects into the curricular, teaching and diploma theses, organising job fairs and providing professional development programmes. The WUE began to monitor graduate labour market outcomes before this became obligatory (alumni career observatory system) and collects regular employer feedback on graduate competencies.

Industry aspects have also been integrated into the doctoral studies, by involving Lower Silesia's business representatives in dialogue and curriculum design. WUE has established a database of research topics relevant to the key business and public organisations in the region. Financial support is available for doctoral students for literature and data acquisition, participation in scientific conferences and consultation with corporate leaders.

Source : Wroclaw University of Economics (Uniwersytet Ekonomiczny we Wrocławiu) (2012), "Kuznia Kadr" (Forging Cadres), presentation at OECD Review Visit, Wroclaw, 22 February 2012.

As Wroclaw's public universities, apart from the Wroclaw University of Technology, tend to provide limited work-based learning or internship opportunities at both undergraduate and postgraduate level, students actively seek non-credit opportunities to improve their employability. Universities show little attention to breadth of "soft" skills that will enable students to transfer easily from education to work. Research students have limited training in intellectual property rights and commercialisation or entrepreneurship. Thus, students who desire to improve their "employability" skills or experience do so outside the formal educational system, taking un-accredited internship opportunities that may exploit their interest rather than provide the requisite training. These internship activities are not formally recognised by the university.

International experience in embedding labour market relevance in study programmes

International examples can inform Wroclaw's higher education institutions for building closer, more systematic links with the world of work. Many universities have taken steps to embed employability and transferable skills in their core curriculum. In the University Rovira i Virgili this is done through ongoing collaboration with locally important industries, while the University of Aalborg in Denmark implements problem-based learning that offers opportunities for students to learn in multidisciplinary teams addressing real-life problems. In the UK, universities have created a number of approaches that ensure that graduates have access to credited, work-related learning opportunities and to learn soft skills during their studies or as part of extracurricular activities. Some such initiatives have targeted students of history. (See Box 2.9).

Box 2.9. Embedding employability in curriculum

University of Rovira i Virgili – industry-based collaboration

The University of Rovira i Virgili in Tarragona, Spain has established a long-term collaboration with the chemical industry in Tarragona that incorporates both education programmes and research that are relevant to the industry needs. Both advanced technical vocational skills and higher degree-based skills, such as in engineering, are designed in co-operation with the local industry representatives. Students participate in internships and co-op programmes within the local firms. Alumni connections are strong. University faculty have on-going relationships with the firms and are allowed to spend time working in local firms during their leaves.

Box 2.9. Embedding employability in curriculum (continued)

Problem-based learning at Aalborg University boosting employability

Aalborg University was established in 1974 after years of popular campaign in the region to establish a university in northern Jutland in Denmark. The campaign formed the basis for a close dialogue with the surrounding society, relying on co-operation with the business sector, trade unions and cultural life. An important early decision was to base research and educational activities on interdisciplinary integration, problem orientation and group work. In Aalborg's project-oriented, problem-based learning model, study programmes are organised around interdisciplinary project work in groups. Up to 50% of the study is problem-oriented project work; students work in multidisciplinary teams to solve real-life problems that have been defined in collaboration with public and private sector and NGOs. At any one time, there are 2 000 to 3 000 ongoing projects to ensure a high degree of collaboration with society and the private sector. The Aalborg model is based on a win-win situation: Students learn transferable skills and gain authentic work experience. Enterprises benefit from a clearer picture of what the university stands for and how students might fit in as prospective employees. The university gets feedback from the world of work and gains access to instructive cases and ideas for research and teaching.

Liverpool John Moores University – World of Work

World of Work is a programme that is co-designed and co-delivered with employers to enhance the employability of students. It is integrated into every degree course offered at the university. There are three inter-related elements: *i)* **Work-related learning**: Every student is offered work-related learning as part of their course, including opportunities to undertake a one-year paid placement, as well as shorter placements and day long "World of Work Uncovered" visits to employer facilities; *ii)* **Graduate skills**: Soft-skills are developed as part of a degree, with academic modules integrating simulations of workplace situations and curriculum input from employers and careers advisors. Students can receive a "graduate skills transcript" upon graduation; and *iii)* **World of Work Skills Certificate**: After completing a process involving an online virtual interview, attending careers workshops, writing three skills statements and finally a filmed interview with an employer, students can be awarded a World of Work Skills Certificate, alongside their degree.

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Box 2.9. Embedding employability in curriculum (continued)

The University of Kent – Employability Points Scheme for extracurricular activities

The Employability Points Scheme rewards students who engage in extra-curricular activities with work-related opportunities. Students who have part-time employment, have learnt a new language, engage in business engagement and enterprise activities, or are active members of clubs and societies, can earn points for their active engagement with university life. They can then apply for employability enhancing rewards, sponsored by their corporate partners, and ranging from work experience and shadowing, to training and summer-long paid internships from companies. In 2012, the scheme engaged 1 932 students and 86 companies, and has awarded over 95 300 points, with an average number of 50, and a top award of 345, across all students signed up to the scheme. They delivered over 275 work experience-related rewards across a diverse range of fields and sectors, with sponsors in the fields of Publishing, Marketing, Consulting, IT, Hospitality, Retail, Arts and Heritage, and Journalism. Their sponsors range from local companies and governing bodies such as Kent County Council, to international giants such as Penguin Books, Tesco, and Coca Cola Enterprises

The Hull History Partnership

The University of Hull has developed partnerships with Hull History Centre and local schools and colleges to improve the employability of history students in the region. It provides training routes to and opportunities for young people wishing to develop careers in history teaching, archives and heritage work, research in universities, and work on public and community history projects. The scheme embeds internships into the history degree through an Applied History module. Hull history students have benefited from work placements at the Hull History Centre, where some students ran history workshops for local primary school students. This collaboration has contributed to other engagement arrangements. For example, undergraduates in 2012-2013 will be able to undertake placements at five local schools. The University of Hull also has links with an internship scheme run by the Ferens Art Gallery and provides valuable work experience in the university's art collection. History students are involved in archaeological digs and community-based activities in local maritime and slavery-abolition heritage centres in the old town.

Source: OECD (2007), *Higher Education and Regions: Globally Competitive, Locally Engaged*, OECD Publishing. doi: 10.1787/9789264034150-en. ; OECD (2011b), *Higher Education in Regional and City Development: Catalonia, Spain 2011*, OECD Publishing. doi: 10.1787/9789264089006-en.; BIS (Department for Business, Skills, and Innovation) (2012), *Following Up the Wilson Review of Business-University Collaboration. Next Steps for Universities, Business and Government*, *www.bis.gov.uk/assets/biscore/higher-education/docs/f/12-903-following-up-wilson-business-university-collaboration-next-steps.pdf*

In Canada, the University of Waterloo is running the world's largest co-op programme of its kind with more than 16 000 students and 3 000 employers (see Box 2.10).

Box 2.10. The Co-operative Education Programme at the University of Waterloo, Canada

The Waterloo Region in Ontario, located about 100 km west of Toronto, has a strong factor advantage of a rich local labour pool largely as a result of a strategic decision made at the inception of the University of Waterloo. The university's founding document in the 1950s (the Waterloo Plan) envisaged a new type of education to be offered on a co-operative basis with industry. The rotation of students to industry and back to the classroom solidified the university's relations with local industry. Today, the University of Waterloo operates the largest post-secondary co-op programme of its kind in the world with more than 16 500 students enrolled over three semesters (60% of the student body) and 3 500 employers involved in the programme each year. It is a model of co-operative education which has spread to more than 100 colleges and universities across Canada.

Extensive co-op programme offers are available in all university faculties and departments and in over 100 different programmes. Many of local and global firms have strong links with the co-op programme. At Sybase, an enterprise software company that spun-off from the original WATCOM Corporation, with over 250 employees in its Waterloo campus alone, 15% of its current employees are Waterloo co-op students, and more than half of their Waterloo staff is former co-op students.

The co-op programme brings a number of benefits to the local economy. It provides a steady source of new hires, because firms know that the students have work experience and get an opportunity to evaluate their performance in the work place before hiring them. Students transfer tacit knowledge and know-how to firms; they also act as a critical source of knowledge circulation within the local high-technology cluster, between different firms as they undertake placements over the course of their integrated work-study programme. The relationship between the university and local industry allows the curriculum to keep up to date with the changing technological frontiers of industry, while industry support of the programme funds the acquisition of technology to enhance classroom learning. Finally, the Enterprise Co-op Programme enables students to start their own venture instead of doing a co-op placement with an established firm, and focuses on creating a local network of contacts and mentors to support it.

Box 2.10. The Co-operative Education Programme at the University of Waterloo, Canada (continued)

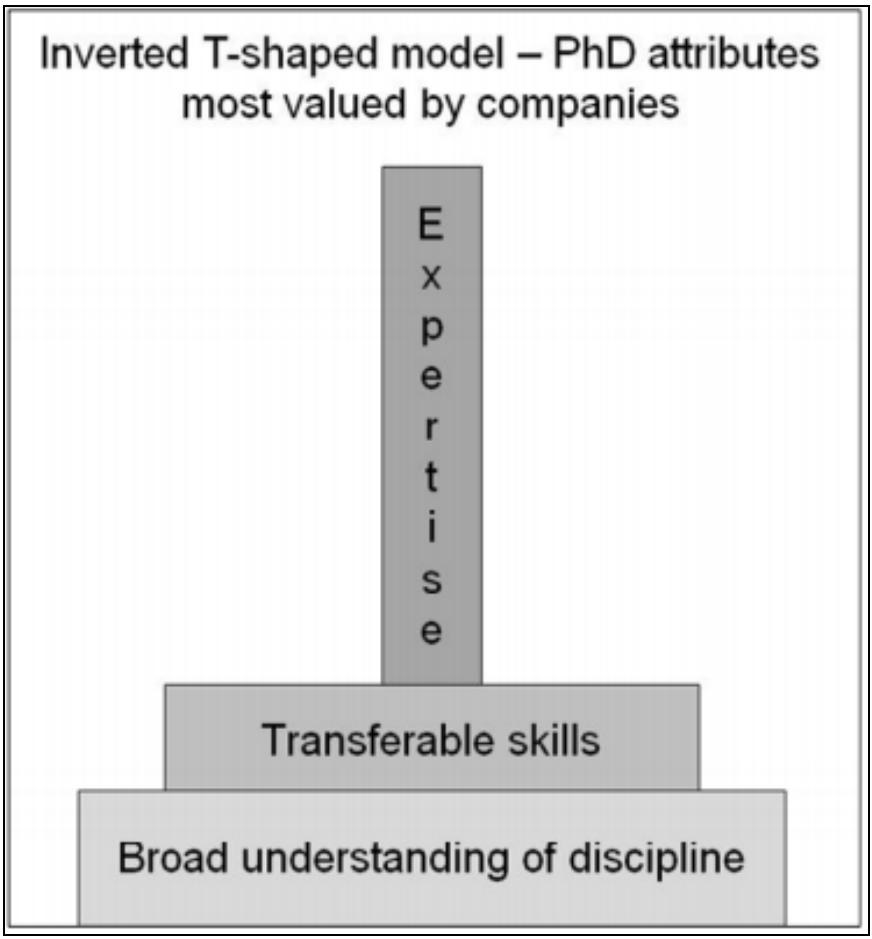
Co-operative Education & Career Action (CECA) administers the co-operative education system and career-related services for the University of Waterloo. CECA staff functions as a liaison between students, employers, alumni, and the different faculties and departments within the University of Waterloo to help determine and facilitate employment opportunities. Employees have access to a complete service team, including an account manager who is the main contact for short- and long-term hiring plans (co-op, full-time, part-time or summer opportunities).

The principal obstacle to the success of the Co-op Programme is the high cost of finding and maintaining the work-term positions for the student body. The university invests a considerable amount of its own resources in financing and managing the programme. However, it now benefits from the high reputation that both the programme and the university's students enjoy, which makes it easier to find firms willing to take the students on co-op employment. The key lesson to be drawn from this experience is that the investment of resources in a programme such as this can pay dividends to the local economy over a long period of time.

Source : Marchese, M. and J. Potter (2011), "Entrepreneurship, SMEs and Local Development in Andalusia, Spain", *OECD Local Economic and Employment Development (LEED) Working Papers*, No. 2011/03, OECD Publishing. doi: 10.1787/5kgdt917nvs5-en; University of Waterloo (2012), Hire Waterloo, *http://uwaterloo.ca/hire*

Wroclaw's and Poland's universities could also consider introducing "structured doctoral programmes" that provide a framework for timely completion over four years and a framework for industry collaboration. A structured PhD model incorporates discipline/interdisciplinary courses or modules and transferable skills as a means of enhancing research training and research career development. While the core component of doctoral training is the advancement of knowledge through original research, it is important that "doctoral training must increasingly meet the needs of an employment market that is wider than academia" (EUA, 2005; Borrell-Damian, 2009). A recent US report emphasised the need to "clarify new and existing career opportunities associated with an advanced degree and to define skills needed to take advantage of various career options" (Wendler *et al.*, 2012). Mobility should be embedded in the programme, in addition to other opportunities such as internships with "industry", embracing the public and private sector as well as the non-profit sector. The following figure (2.8) provides a useful illustration.

Figure 2.8. Structured PhD Model



Source: ACSTI (Advisory Council for Science Technology and Innovation) (2009), *The Role of PhDs in the Smart Economy,* Forfas, Ireland, *www.forfas.ie/media/asc091215_role_of_phds.pdf.*

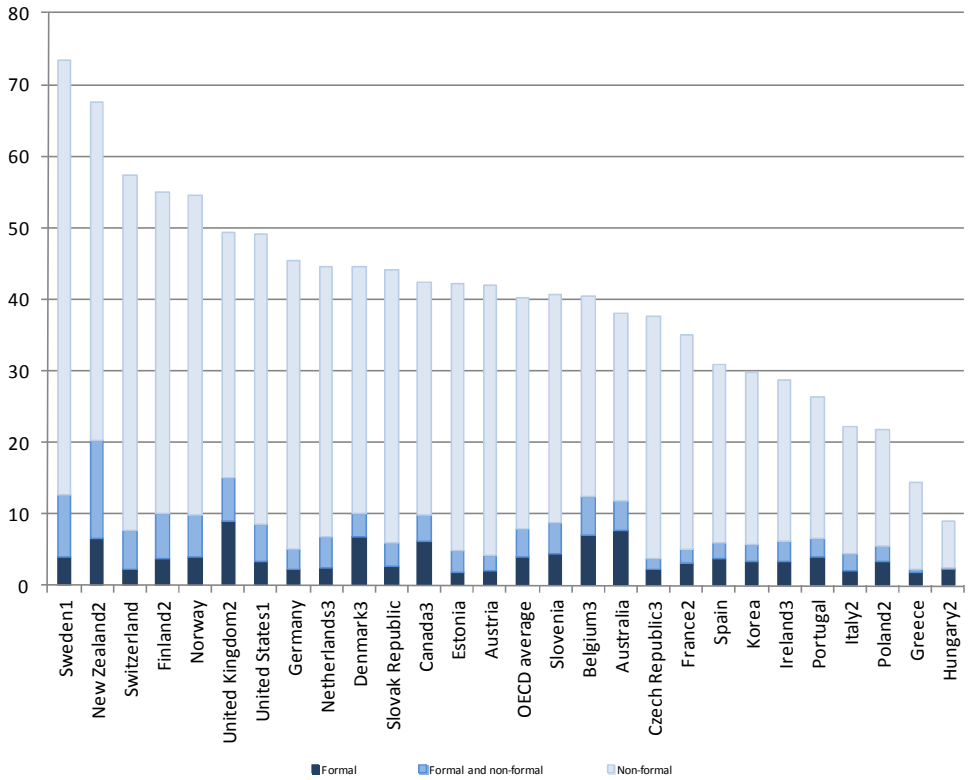
Lifelong learning

As globalisation and the development of the knowledge economy intensify, an increasing portion of the population must be educated and able to meet the needs of new industries. This is especially important for Lower Silesia and Wroclaw given the demographic change and the location within a dynamic corridor in Eastern Europe. The concept of lifelong learning

"shifts responsibility for education and learning to the individual, focusing on the development of individual capability and the capacity to learn; it implies a shift from traditional education institutions to diverse learning opportunities that are more process and outcome-oriented" (Badescu and Saisana, 2008). Lifelong learning includes learning that takes place in the work-place as well as other modes of programme delivery.

In international comparison, participation in adult education in Poland is much lower than elsewhere in the OECD and EU. In Poland, 20% of adults, aged 25-65 years, participate in some form of learning or training, compared to the OECD average of more than 40% of adults (Figure 2.9). Polish citizens invest one of the lowest amounts of time in education and training over their working life time: 500 hours compared with an OECD average of over 1 000 hours. When comparing participation in lifelong learning throughout the life-cycle, Poland remains below the EU average. EU countries receive overall Index scores ranging from 47.2 (Poland) to 95.2 (Sweden), while the EU27 average was estimated at 67.7. "The ideal (feasible) performance given the 2000-2005 datasets would have been a 100% participation in Early Childhood Education, a 33.4% participation in Formal Education and 68.3% in Education & Training". Poland compares favourably with European colleagues only with respect to participation in formal education; otherwise it is far behind, especially in what is generally viewed as lifelong learning for the 25-64 year old cohort (Badescu and Saisana, 2008).

Figure 2.9. Participation in formal and/or non-formal education, 2007



1. Year of reference 2005.
2. Year of reference 2006.
3. Year of reference 2008.

Source: OECD (2011a), *Education at a Glance 2011: OECD Indicators*, OECD Publishing. doi: 10.1787/eag-2011-en.

Poland's underperformance in lifelong learning is partly due to the insufficient policy incentives. The opportunities offered to adults to undertake studies in tertiary education remain underdeveloped. Strategies for promoting lifelong learning are embryonic and there are no provisions to allow attendance on the basis of a person's assessed competencies instead of formal qualifications. Entering students who are 25 and over (who form a small minority) do not have access to the national loan scheme. There are no special scholarships for mature students either, so this group is dependent upon private sources.

The national government has acknowledged these shortcomings and efforts are now being made to develop "A perspective for lifelong learning" at the national level, while several projects are carried out within the framework of of the European Social Fund. The implementation of the lifelong learning policy is part of the National Reform Programme. In addition, an amendment of Higher Education Law including incentives for lifelong learning is currently under intersectioral and social consultations. (Ministry of Science and Higher Education, written communication, December 2012)

In view of the ageing demographic profile of the region and the qualifications disparity according to age, Wroclaw's higher education institutions have taken steps to build their capacity in this domain. Seven separate third-age universities (the first one established by the University of Wroclaw in 1976) offer classical higher education to senior citizens for self-development, but do not address labour market opportunities. Universities have established centres of continuing education that serve both the university community and external clients. For example, the Centre of Continuing Education of the Wroclaw University of Technology offers skills updating and evaluation of professional qualifications, as well as facilitating the change of professional speciality and the acquisition of a second profession or specialised skills. In addition to the centralised centre of continuing education, WUT faculties and departments also deliver professional development courses. The University of Lower Silesia has an active approach to lifelong learning and it participates in international lifelong learning projects. These projects highlight the "Experiences of Non-traditional Learners in Higher Education", improve the participation of the elderly on the labour market, and develop Lifelong Learning Strategies with focus on knowledge transfer in vocational education.

Despite the progress made, Wroclaw's universities are more geared towards catering to the traditional young student population than providing opportunities for "second chances" or up-skilling and re-skilling. No institution or sets of institutions appear to have responsibility for continuing education or lifelong learning in Wroclaw. Educational opportunities for mature students, or to facilitate career advancement or change through up-skilling or re-skilling, remain limited and are available only through part-time, tuition-based provision. Limited student mobility within Wroclaw's post-secondary education sector does not provide adequate choice for learners who are unable to attend university. The bulk of courses, trainings and postgraduate programmes that address specific vocational needs result from trade association standards or statutory requirements to acquire a specific license or certificate, reflecting the fact that Poland is the European leader in regulating professional standards (380 professions are subject to

regulation, compared to 152 in Germany and 174 in Spain). While non-public, independent institutions offer programmes in the lower-cost social sciences and business, and in information technology disciplines, the employment mix within the region (see Table 2.4) or future opportunities require more robust provision to help upgrade manufacturing and services. In the STEM disciplines, where the government is hoping to underpin economic development into the future, the only opportunities for mature students are in relatively basic information technology.

Some companies in Wroclaw indicated they were working closely with the universities to develop graduates for the workplace, but there are few examples of in-company training. For example, IBM has sponsored MBA studies for its employees during weekends, but interest has dropped due to recent change in legislation that requires employers to pay for extra holidays as well. The industry-driven, non-public International University of Logistics and Transport in Wroclaw (*Międzynarodowa Wyższa Szkoła Logistyki i Transportu we Wrocławiu*) provides professional up-skilling to logistics companies. Most of its students are employed in the logistics sector and are sponsored by their employers to update their skills.

Given the ageing demographics and lower educational levels of non-traditional age cohorts in Poland, Wroclaw's tertiary education institutions need to engage in lifelong learning opportunities and to be more responsive to the needs of adult learners. Collaborative efforts in this area would be particularly useful. Access to tertiary education should be allowed on the basis of prior learning and include individuals of all ages. Institutions should also offer more support and more flexibility for people of all ages (including young people) who work and study simultaneously.

Table 2.4. Persons employed in enterprises by sectors, December 2011, Lower Silesia

Sector	%
Manufacturing	39.4
Trade; repair of motor vehicle	17.7
Administrative and support service activities	10.6
Construction	7.8
Mining and quarrying	5.3
Transportation and storage	3.7
Accommodation and catering	3.2
Professional, scientific and technical activities	3.0
Water supply; sewage, waste management and remediation activities	2.2
Information and communications	1.9
Real estate activities	1.7
Arts, entertainment and recreation	1.5
Electricity, gas, steam and air conditioning supply	1.1
Other	0.6
Other service activities	0.4

Source: Central Statistical Office (Główny Urząd Statystyczny) (2013), Report on Socio-economic Situation of Dolnośląskie Voivodship in 2012, Central Statistical Office (Główny Urząd Statystyczny), Warsaw, forthcoming.

Internationalisation

The city of Wroclaw has ambitious plans to position itself as a central European "knowledge metropolis" that attracts and retains national and international talent, professionals, researchers and students. Anecdotal evidence suggests that Wroclaw is well-placed to welcome newcomers because of the city's ethnic and religious diversity, which is a lasting legacy of its past. Wroclaw also became home to many who were driven from their homes over the past centuries, which has resulted in a local identity that is more accepting compared to other Polish cities. Capitalising on its openness, heterogeneous population, business-friendly environment and ability to attract foreign investments, Wroclaw has become home to numerous foreign-born citizens, including both high-skilled expatriates working mainly in the multinational companies and migrants in low-skilled jobs. In addition to Poles, Wroclaw's residents include diverse nationalities with different ethnic and religious backgrounds, such as Germans, Czechs, Jews, Hungarians, French, English, Dutch and Belgian people, Scandinavians, Americans, Ukrainians, Greeks, Roma, Lemkos, Karaites, Armenians, Arabs, Chinese, Japanese, Koreans, Vietnamese etc.

Acknowledging the impact of demographic change and the needs of the multinational companies for specialised skills, the city of Wroclaw has

pioneered a number of high profile talent attraction campaigns. In 2005, the city and higher education institutions launched a collaborative campaign targeted at high school students and mobile employees in Poland. In 2006, Wroclaw launched the campaign "Come back!" with the purpose of attracting part of the Polish diaspora, informing young Poles living in London and other cities in Europe about career opportunities in Wroclaw. In 2006, again in collaboration with the local HEIs, the city launched the Wroclaw Now project (*Teraz Wroclaw*), which brands Wroclaw as an attractive place for international students from Eastern Europe, recognising that Wroclaw is not well-known outside its own hinterland (Box 2.11). The city of Wroclaw's RDI arm, the Wroclaw Research Centre, has successfully embarked on attracting cutting-edge researchers, mainly from the Polish diaspora, by offering modern facilities and a more welcoming environment than Wroclaw's traditional universities. The city of Wroclaw has also made efforts to increase international opportunities for Wroclaw academia by attracting the second office of the pan-European association Academia Europaea, which brings together world-class scientists and scholars from Europe. The aim of the Academia Europaea Knowledge Hub, which opened its doors in 2012, is to provide international seminars and conferences, research partnerships, and personal contacts to researchers in Wroclaw.

Box 2.11. *Wroclawski Indeks* and Wroclaw Now (*Teraz Wroclaw*)

Wroclawski Indeks is an ongoing campaign established in 2005 to promote Wroclaw as an ideal place to "study, work and play". The first road show, organised in 2005, embraced universities and employers in six Polish cities. In addition to road shows, *Wroclawski Indeks* includes an online competition, the Kindness Day, the Wroclaw Market Square Gaudeamus and promotional events with Wroclaw's bands and artists, such as in Poland and the UK in 2007. In 2010, a group of Wroclaw's universities agreed to hold a joint *Wroclawski Indeks* Fair event.

Established in 2006, the *Teraz Wroclaw* Project is a collaborative effort by four public and three non-public universities for international recruitment in Wroclaw. Participating HEIs are: the University of Wroclaw, Wroclaw University of Technology, Wroclaw University of Economics, Wroclaw University of Environmental and Life Sciences (*Uniwersytet Przyrodniczy we Wroclawiu,* WUELS), University of Lower Silesia (*Dolnośląska Szkoła Wyższa*), Wroclaw School of Banking (*Wyższa Szkoła Bankowa we Wrocławiu*) and College of Management "Edukacja"(*Wyższa Szkoła Zarządzania „Edukacja" we Wrocławiu*).

Box 2.11. *Wroclawski Indeks* and Wroclaw Now (*Teraz Wroclaw*) (continued)

The *Teraz Wroclaw* project promotes Wroclaw in Eastern Europe with focus on study opportunities. Target countries are: Belarus, Kazakhstan, Lithuania, Moldova, Russia, Turkmenistan, Ukraine and Uzbekistan. The *Teraz Wroclaw* office co-ordinates pre-admission formalities to guide and assist candidates who wish to study in Wroclaw. It helps students adapt to their new environment, and maintains an information and guidance centre for universities, as well as online administration. Between 2007 and 2011, 338 students have enrolled in Wroclaw's HEIs through the *Teraz Wroclaw* project. Admissions have grown from 21 in 2007 to 102 in 2010 and declined to 89 in 2011.

Teraz Wroclaw provides a single channel of information and services for all universities. Working closely with consulates and embassies abroad, it helps build the Wroclaw brand; in addition, each university has its own internationalisation strategy. International students are also used as ambassadors. Collaboration between HEIs works well because each HEI has a relatively distinct profile, which ensures that they do not compete for the same cohort of international students. Scholarships are offered for the best candidates, although students must earn or have their own money to live. *Teraz Wroclaw* aims not only attract, but also retain international students in Wroclaw – helping to ensure graduates remain in Lower Silesia to work and set down permanent roots. Paid internships are being developed because graduates who find subject-oriented jobs tend to be most satisfied. The *Teraz Wroclaw* programme also helps with relocation, language skills, introduction to the academic milieu, introduction to other international students, etc. A ten-day introduction course is offered, free of charge.

The *Teraz Wroclaw* programme is the first such initiative in Poland; Poznan and Krakow are thinking of doing something similar. International examples include, for example, "Education Ireland," under which the state company, Enterprise Ireland, has been given the remit to market Irish education internationally.

Source : Teraz Wroclaw (2012), "Teraz Wroclaw" Project: Study in Wroclaw, http://study-in-wroclaw.pl/en.; Education Ireland (2012), Education in Ireland, www.educationireland.ie.

The strategy to internationalise Wroclaw is a realistic response to the dramatic decrease of the traditional student cohort, but greater efforts are needed to increase internationalisation of Wroclaw's HEIs. Currently, the efforts to recruit international students focus on Eastern Europe, particularly Ukraine, because of historical and cultural links. While 70% of international

students come from the Ukraine, the overall international student numbers remain very small (see Table 2.2). While the two biggest universities, Wroclaw University of Technology and the University of Wroclaw, attract the largest number of international students, 678 and 628, respectively, the share of international students in these universities is relatively low: 2.06% at the Wroclaw University of Technology and 1.81% at the University of Wroclaw. The share of the international students is highest in Wroclaw Medical University (7.65%, 427 students) which has developed a strong international agenda. In all other institutions, the share ranges from 0% to 1.72%. No robust data was available about staff mobility, but it was widely acknowledged to be at a generally low level without a clear strategy.

There is underutilised potential for on-campus internationalisation in Wroclaw's higher education institutions, such as through stronger integration of international students in the academic and student life, and language learning efforts. An informal survey in Wroclaw shows special challenges related to the adaptation of students with non-European backgrounds (Wroclaw's Regional Steering Committee, 2011). The interviews during the OECD review visit also disclosed some attitudes among faculty that were less welcoming to non-European students. There also appears to be an inability to capitalise on the interest among Chinese students in Polish classical music. There is also a lack of initiatives to link international students with the employers in Wroclaw or to mobilise them as ambassadors for Wroclaw.

Table 2.5 provides a review of the different components that an internationalisation strategy at the institutional level should ideally have, as well as a review of the gap existing between these components and the current situation of Wroclaw's higher education institutions. It is recommended that higher education institutions develop a roadmap for bridging this gap on the difference between the stages as identified in the table. By fostering higher education institutions at the local level to develop and implement internationalisation plans, and by aligning its incentives, policies and financial support mechanisms, the city of Wroclaw could be of great help in assisting the higher education system to become more internationalised.

Table 2.5. A comparative advantage of internationalisation of higher education in Wroclaw

Internationalisation elements	Level of development and implementation in leading countries and institutions	Situation in Wroclaw
International dimension in the institutional mission.	The international dimension is clearly defined as part of the institutional mission.	An indirect mention to the international dimension is included in some institutional missions.
Internationalisation policy.	Clearly defined and publicised.	Exists in large public institutions and some non-public institutions. Non-existent in a large number of institutions
Office of International Programmes (OIP).	Formal unit fully dedicated to support internationalisation. Adequately trained professional staff. Formal budget.	OIP exists in large public universities and leading non-public institutions. OIP's report to vice rectors and depend heavily on standard governance channels (no special mandate to approach internationalization policy holistically, including programme-related decisions as part of education product development) Formal budget for OIP in large universities and leading non-public institutions, but in some institutions multi-annual policy vulnerable to vacillations related with external project-based budgeting.
Internationalisation of the curriculum.	Present in most of the academic programmes. Mechanism in place to include the international dimension when relevant in courses.	Only present in a few academic programmes. No formal mechanism established to include the international dimension in the review of the curriculum.

Table 2.5. A comparative advantage of internationalisation of higher education in Wroclaw (continued)

Outbound student mobility.	5-10 % of all domestic students participate in a study abroad programme.	Less than 3% of domestic students participate in a study abroad programme.
Inbound student mobility.	5-10 % of total enrolment composed of international students (including degree-seeking and exchange students).	Considerable diversity among institutions ranging from 0% to nearly 8% (non-public Medical University). 1.7- 2.1% in leading public universities. For most institutions, around 1%.
Full command of a second language.	All students must demonstrate full command of a second language.	Policies in place in some institutions, although not enforced. Students rely on optional remedial, fee-based courses to gain full command of a second language.
International academic staff mobility.	In-bound and out-bound mobility of academic staff. Sabbatical programmes aimed at international experiences. Policies to attract foreign teaching academic staff.	Limited number of academic staff being supported for out-bound mobility, mostly at large institutions. Insignificant number of foreign academic staff in regular teaching activities.
Subjects being taught in a foreign language.	Availability of some regular subjects being taught in a foreign language.	Master's programmes and separate courses in English and some in German, *e.g.* WUT offers Master's courses in 18 specialisations as well as courses at bachelor level in English and German.
International partnerships for the development and offer of dual/joint/sandwich degrees	Offer of degrees in conjunction with selected international partners. Strict internal quality assurance policies and regulations aimed at guaranteeing similar quality to regular domestic offers.	Some programmes offered in conjunction with international partners. No formal quality assurance policy.

Innovative approaches to internationalisation include Wroclaw University of Technology's Leonardo da Vinci Project that focuses on women engineers. The project, called FUTURE (Female Wroclaw University of Technology Graduates in European Enterprises), led by the Wroclaw University of Technology, offers WUT's 31 best female graduates an opportunity to enrich their university education with practical skills, improve their language skills and stimulates professional mobility. The University of Lower Silesia maintains a strategy to use Wroclaw's urban space as an international learning environment for urban education and anthropology.

Box 2.12. University of Lower Silesia: using the urban space as laboratory for international learning

The University of Lower Silesia (*Dolnośląska Szkoła Wyższa*, ULS) is a non-public university that promotes new approaches to learning. ULS has built international study and research programmes that use the urban space of the city of Wroclaw as a learning environment for urban education and anthropology. ULS programmes tap into Wroclaw's urban laboratory to allow students to investigate the past and present dynamics of a Central European metropolis in transition. ULS uses international co-operation to develop its existing educational portfolio by expanding the scope of the study programmes and forging new links with other academic institutions such as the New School for Social Research in New York and State University of New York.

ULS's **Experiencing the New Europe (ENE)** is an intensive, four-week international summer programme open to undergraduate and graduate students. Co-organised by State University of New York, it combines classroom study with on-site experiential learning in the transforming urban context of Europe. Students spend most of their time outside of the classroom, working in a group under the supervision of instructors, investigating a specific city space through ethnographic methods. By using action research methods, students produce concrete work that improves our common understanding of the significance of the research area. Urban Research Seminar students complete projects that add lasting value to the local community. This programme aims to give students a robust grounding in the history and culture of modern Central Europe. Learning takes place outside of the classroom, using the Wroclaw city space as a laboratory. Participants meet and exchange ideas with academics, artists, filmmakers, policy makers, spiritual leaders and grass-roots activists. In 2011, the United States National Collegiate Honors Council recognised the programme as a Model Honors Study Abroad learning experience. As an integral part of ENE, participants prepare self-guided tours that are published and distributed by local tourist information offices. .

Box 2.12. University of Lower Silesia: using the urban space as laboratory for international learning (continued)

The guides are promoted by a dedicated website – *http://wroclawonyourown.pl*. The English-language site offers the student projects to a worldwide audience. Another course, **From Mittel Europa to Central Europe**, involves an annual four-day group visit by from 50 students and faculty of Syracuse University who, as part of the study abroad programme in Strasbourg, undertake intensive field study of post-socialist transformation of Wroclaw. The programme studies Wroclaw as a living and dynamically developing organism. It includes discussions with people in local businesses and organisations, politicians, artists and scholars who specialise in the study of post-socialist transition and the history and life of Wroclaw.

Source : University of Lower Silesia (2012), "Panel dyskusyjny nt. Budowanie marki Wroclawia a rozwoj oferty edukacyjnej" (Thematic meeting on brand building and developing education offer).

Currently, Wroclaw higher education institutions seem to lack a comprehensive strategy for the internationalisation of the curriculum that would impact the whole education system and all students, not only the very small number of internationally mobile students, and which would transform structures, academic models and offers. Wroclaw's HEIs could find inspiration from the State of Victoria in Australia, where the tertiary education sector accounts for over 5% of the state of Victoria's GDP and educational services are Victoria's strongest export, worth more than AUD 5.4 billion, surpassing tourism and automotive sectors. Victoria's universities are restructuring or reformulating their approach to teaching, learning and research, by creating "global citizen initiatives". For example, the University of Melbourne has restructured its curriculum, introducing six 3-year undergraduate degrees. An innovative feature of the Melbourne Model is the development of university breadth studies, which adopt an inter-disciplinary approach to disciplinary or global challenges, *e.g.* climate change, human rights and global justice or emerging technologies for transformation. Other global citizen initiatives include "Monash passport" and RMIT University's "Global passport" that enables students to combine degree programmes with international exchanges, leadership programmes, work training programmes and volunteer and research opportunities. These initiatives broaden the curriculum to allow students to develop additional skills either in Australia or abroad, which will enable them to "excel in an open world economy" (RMIT University, 2012). They have a strong focus

on employability and soft skills, by providing experiential learning opportunities (see Table 2.6).

Table 2.6. Global citizen initiatives

Initiative	Main features
Melbourne Model, University of Melbourne	Six broad-based undergraduate degrees with key features: disciplinary depth, breadth studies, knowledge transfer and capstone experience. Together with increased prospects for internships, study abroad and participation in industry projects, the degrees offer the chance to explore a range of interests before committing to a particular career path.
Monash Passport, Monash University	Combines degree programmes with international exchanges, leadership programmes, work training programmes and volunteer and research opportunities as a grounding for careers.
Global Passport, RMIT University	International education and industry networks provide a wide range of opportunities for students to enhance their education or research experience – at the university's campuses in Melbourne and Vietnam; with partner institutions in Singapore, Malaysia and China and through education and industry links throughout the world.
Graduate Capabilities Statement, Victoria University	Graduate capabilities transcend technical skills and curriculum content and enable students and graduates to be work, career and future ready. On graduation, students will receive a Victoria University Graduate Capabilities statement as part of the Graduation Statement.
Curriculum Framework Project, Swinburne University of Technology	Model for Professional Learning which emphasises real world learning experiences within a supportive environment, integrated with skills development in order to prepare graduates to make the transition to professional practice.

Source: OECD (2010a*), Higher Education in Regional and City Development: State of Victoria, Australia* 2010, OECD Publishing. doi: 10.1787/9789264088979-en.; University of Melbourne (2008), The Melbourne Degrees*, http://futurestudents.unimelb.edu.au/courses/melbourne-degrees*.; Monash University (2012), The Monash Passport, *www.monash.edu.au/study/options/more/passport.html*; Victoria University (2012), "Graduate Capabilities Statement," Victoria University Central Policy Register On-Line, *http://wcf.vu.edu.au/GovernancePolicy/PDF/POA050510000.PD*F; RMIT University (2012), Global Passport, www.rmit.edu.au/globalpassport; Swinburne University of Technology (2012), Curriculum Framework Project, *www.swin.edu.au/hed/framework.*

Global university rankings

The position of universities in global university rankings is a point of discussion and concern in Poland and also in Wroclaw. Table 2.7 shows the current position of Polish universities, across the different rankings, relative to a select group of countries including other post-1989 transition democracies. During the OECD review visit, some interviewees noted that Wroclaw should aim to increase its position in the rankings. Some proposed that universities should rationalise their provision, and merge to create one

"world class" university in order to maximise research output and enhance the position in global rankings.

Table 2.7. Number of top 200 and 500 universities in selected rankings, 2011

Country	QS		THE-TR		ARWU		Webometrics		SCImago	
	200	500	200	400	200	500	200	500	200	500
Poland	0	2	0	1	0	2	0	3	1	3
Hungary	0	1	0	0	0	2	0	3	0	1
Estonia	0	0	0	1	0	0	0	1	0	0
Slovenia	0	0	0	0	0	1	0	1	0	1
Czech Rep	0	1	0	1	0	1	2	4	2	2
Slovakia	0	0	0	0	0	0	0	1	0	1
US	51	98	0	0	89	151	95	172	70	144
Japan	11	24	0	0	9	23	6	12	11	21
Germany	12	36	12	22	14	39	12	47	10	40
UK	28	51	32	52	19	37	10	37	14	30

Source: Key: QS = Quacquarelli Symonds (2012), 2011 Top Universities Ranking, www.topuniversities.com/university-rankings/world-university-ranking; THE-TR = Times Higher Education Ranking powered by Thomson Reuters (2012), Top 400 World Universities, *www.timeshighereducation.co.uk/world-university-rankings*; ARWU = Academic Ranking of World Universities (2012), Academic Ranking of World Universities 2011*, www.shanghairanking.com;* Webometrics = Ranking Web of World Universities (2012), Top 500 Webometrics Ranking of World Universities, *www.webometrics.info*; SCImago = SCImago Journal and Country Rank (2012), Country Rankings, *www.scimagojr.com.*

In a globally competitive world, quality and excellence must be at the top of the agenda for all stakeholders in Wroclaw, but the concept of quality should be understood as broadly as possible. University rankings are often used as a mechanism to attract talent and foreign direct investments, but they are also widely criticised (see Box 2.13). Despite their shortcomings, rankings play an increasingly important role in global higher education. It is therefore advisable to complement rankings at the institutional or system level with other methodologies, such as quality assurance and benchmarking, (Hazelkorn, 2012a, 2012b, 2012c).

Box 2.13. University rankings: key criticism

Since 2003, global university rankings have become used as a measure of educational quality. They are used to brand a country or region, using the ranking of universities to attract capital and talent. Many countries, regions and universities have sought to identify their ambition and mission in terms of placement within the top 100 of global rankings. At the same time, rankings have raised growing criticism of the narrow definition of excellence and unsustainable costs of building a world class university.

University rankings promote a single model of excellence, usually narrowly defined as excellence in research. They focus on what is easily measured as distinct from what is important. Assessing "which university is best" depends upon who is asking the question and which question is being asked. Rankings do not have capacity to assess the full breadth of higher education:

- Rankings do not measure educational quality, *e.g.* the quality of teaching and learning or the quality of the student experience.
- Bibliometric data, used to measure research activity, is less reliable for the arts, humanities and social science disciplines, and there is no focus on the impact or benefit of research.
- Rankings give no attention to regional or civic engagement.

The budget for a "world class university" is estimated to be approximately EUR 2 billion per annum. This is significantly more than the total national higher education budget of many countries. To provide this level of funding, on a consistent basis, would require re-orienting national funding away from other social and economic priorities and HEIs in favour of a single university. Concentrating investment in a single university is likely to increase inequality and could reduce the overall research capacity. Better results can be achieved by focusing on the quality of overall performance rather than focusing narrowly on an individual institution. The key factor underpinning improved performance and competitiveness is the level and consistency of investment.

Source : Hazelkorn, E. (2011), *Rankings and the Reshaping of Higher Education: The Battle for World Class Excellence*, Palgrave Macmillan, Houndmills, Basingstoke, Hampshire, New York; Hazelkorn, E. (2012d), "World-Class Universities or World-Class Systems? Rankings and Higher Education Policy Choices", in E. Hazelkorn; P. Wells and M. Marope (eds.), *Rankings and Accountability in Higher Education: Uses and Misuses*, UNESCO, Paris, forthcoming.

Given the current diverse views about higher education sector's future in Wroclaw, it is important to develop a shared vision for the future of the city region and of tertiary education. Currently, there are divergent views: some

advocate a merger of all or some public universities in order to raise the profile of universities in global rankings, some propose better co-ordination between the existing institutions, while some advocate status quo. The success of the internationalisation strategy for Wroclaw shows that collaboration between different stakeholders is possible on the basis of managing individual interests in favour of the overall success of the objective, in this case recruiting more international students. Agreement on an overall postsecondary landscape for Lower Silesia could help make institutional distinctiveness more visible, and aid strategic planning, capacity building and branding.

Creating a dynamic world-class tertiary system[5] in Wroclaw would improve quality, competitiveness and attractiveness (Douglass *et al.*, 2011; Hazelkorn, 2011). Currently, Wroclaw's HEIs operate as individual institutions that have little formal linkage with the city of Wroclaw, the region or with business, industry and civil society. A common approach can be established, for example, by creating a stakeholder cluster with the objective of enhancing collaboration. This initiative need not interfere with institutional autonomy.

Conclusions and recommendations

Tertiary education in Poland and Wroclaw is in the process of long-term transformation, in response to the emerging economic developments and opportunities in the wider region, and consecutive changes and amendments to the Higher Education Law, most recently in 2011. In many respects, the issues identified throughout this chapter are typical of many countries, and particularly countries in Central and Eastern Europe that are undergoing transformation. In seeking to address these challenges, governments at different levels should take steps to create a coherent tertiary education system, ensure that the education meets the needs of society and the labour market, addresses issues of equity and ensures quality and accountability.

Poland and Wroclaw have a fragmented set of higher education institutions, which, as a system, lacks diversity; it is primarily a university system, while vocational tertiary education remains underdeveloped. Institutions are differentiated according to the discipline type (University of Economics, University of Medicine etc.) or funding base (public, tax-based or non-public, tuition-based). While vocational, non-university institutions have been developed in recent years, alternative pathways or ladders of opportunity do not exist in practice. The prominent public universities are located in the Wroclaw metropolitan area, while non-public tuition-based institutions are present throughout the wider region.

The university-dominated system in Poland and Wroclaw presents many challenges for the future: it reduces educational opportunity and choice, limits the skill levels available to society, inadequately prepares the population to cope with dynamic labour market circumstances, and fails to address structural inequity. It limits opportunities for non-traditional and older workers who have been "locked out" due to changes in the economy/labour market. The end of the "demographic bubble" will expose Poland and Wroclaw to a shortage of skilled labour at the point when knowledge-intensive companies and business require more talent.

Authorities at national and local levels should regard higher education as part of an enlarged post-secondary or tertiary system – which includes both further, vocational and higher education institutions. In Wroclaw, more attention should be given to creating more vocational or "non-university" opportunities, in addition to enhancing the diversity of university missions, in order to provide a broader range of educational opportunities and student experiences. This includes integrating urban regeneration activities with creating multiple entry routes to tertiary education, due to close correlation between low socio-economic status and weaker academic background.

More efforts are also needed to improve its relevance of Wroclaw's higher education provision which remains academically driven. Higher education provision in Wroclaw is focused around traditional BA and MA pathways, with the majority of students taking social science and business subjects. At the undergraduate level, there is limited evidence of interdisciplinary studies, new disciplines, or new pedagogical teaching and learning approaches. Doctoral training follows a traditional format, with few opportunities for work-based or industrial PhDs. Students at all levels are insufficiently prepared for employment. The current education provision has a lack of focus on employability skills, work-based learning, internship opportunities, entrepreneurial training, and intellectual property rights consciousness. To acquire these skills, students undertake training outside of the educational system, which receives no credit and is not part of the curricula.

Lifelong learning to ensure that older generations have up-to-date skills will become increasingly important for Wroclaw because of the reducing youth cohorts and location within a dynamic corridor in Eastern Europe. Wroclaw's universities need to engage more actively in lifelong learning opportunities and to be more responsive to the needs of adult learners and older workers who have been "locked out" due to changes in the economy/labour market. Collaborative efforts in lifelong learning would be particularly useful.

Acknowledging the impact of demographic change and the needs of the multinational companies for specialised skills, Wroclaw's city administration has pioneered a number of high profile talent attraction campaigns. While talent attraction is important, Wroclaw will also need to nurture existing talent at home. In other words, the ease with which Ukrainian or other students can be attracted to study in Wroclaw should not displace the more difficult task of widening participation to students and socio-economic groups previously outside the tertiary system and the need to internationalise the non-mobile student body of Wroclaw's universities.

The level of higher education institutional capacity in Wroclaw, demographic change and the new Higher Education Law provide the opportunity to resolve social and regional inequity and disadvantage in Wroclaw and Lower Silesia. They will also provide the incentive to develop a diverse range of education opportunities, and consider how tertiary education can meet regional social and economic needs. These developments will provide an opportunity to establish equilibrium between public and non-public provision, resolve outstanding questions regarding quality and equity, and facilitate provision of lifelong learning. However, given the current limited acknowledgement of equity issues in education in Poland, higher education institutions will require stronger government steering towards widening access and ensuring success in higher education. Universities and other higher education institutions need incentives to widen participation of under-represented groups and to assist those groups with extra support.

The OECD review team recommends that the following measures be taken to improve the human capital and skills development outcomes:

Recommendations for the national government

- Ensure that the National Qualifications Framework that is under preparation recognises and promotes a strong set of diverse post-secondary educational provisions, which provide a wide range of learning opportunities and student experiences, as well as facilitating learning pathways from secondary to lifelong learning.
- Reduce inequalities in education and training participation by age and skills by adopting a three-pronged strategy: First, increase investment in lifelong learning at mid-career. Second, improve the attractiveness of training and its returns for older learners by adapting teaching methods and content to their needs, by the provision of short, modular courses and through the recognition of

prior learning and experience. Third, promote later retirement to encourage greater investment in training older learners.

- Revisit the achievements of the Bologna Process and continue the process of curriculum reform to encourage flexible pathways and enhance mobility through credit accumulation across Poland and internationally in order to avoid superficial structural change.
- Carefully monitor the equity impacts of the current student financial support, particularly the scholarship model, for disadvantaged (low socio-economic status), mature and part-time students. Consider whether the student support system can be expanded and based on a system of means-tested grants, complemented with a universal, income contingent loan scheme, with fee waivers for the neediest students. Consider introducing a special financial incentive for institutions to attract under-represented groups and affirmative action to take applicants' educational backgrounds into account in the selection process. Establish initiatives for higher education institutions to widen access at the entry point and to support students from disadvantaged backgrounds as they progress through their studies.
- In collaboration with regional and local stakeholders and higher education institutions, assess current and planned capacity against anticipated student numbers in different regions. Encourage infrastructure-sharing arrangements between education providers and establishment of tertiary education centres that draw on a range of providers

Recommendations for the local/regional government

- Develop a co-ordinating structure and appropriate mechanisms to articulate a long-term vision and strategy for human capital and skills development stretching from primary education to tertiary education and lifelong learning. Outline clear qualitative and quantitative goals and confirm the respective contribution of individual institutions (or types of institution), building relationships among the different components of the education sector. Establish an information system to monitor the performance of higher education in the region and benchmark its progress with appropriate comparators in the country and with OECD countries. This requires: *i)* robust data on the status of the region's human capital, ii) a policy audit to identify barriers to meeting needs, *iii)* regional/national policy to foster higher education institutions with multiple, complementary missions aligned with regional needs, and *iv)* possible revision of student selection, finance policy

(institutional, regional and national student support) and governance/regulation. Develop data and information on: *i)* educational attainment rates benchmarked to country-level achievement, the OECD average and the best-performing OECD countries, ii*)* migration by educational level and age, iii) regional higher education participation rates (age groups including youth, adults; socio-economic status), *iv)* robust information on which institutions serve the region's population, *v)* labour market needs, *vi)* degrees awarded by regional tertiary education institutions and *vii)* functioning pathways between and among higher education institutions, as well as other levels of education.

- Create mechanisms for enhanced collaboration between HEIs, and between HEIs and the city/region, building on the successful examples of collaborative efforts such as *Teraz Wroclaw*.

- Map the post-secondary education landscape to help brand Wroclaw as a "region of knowledge".

- Consider launching a city-driven flagship programme to support women leadership in business, academia, arts and culture.

- Facilitate stronger, evidence-based strategic decision-making through robust data. The most effective region-wide graduate labour market systems are based on the collection of comprehensive labour market intelligence and online publication of the data in a single place. This improves students' ability to make rational choices about their studies, helps graduates and employers to come together and helps students find employment. Effective labour market systems use the data strategically to identify regional and institutional priorities and help higher education institutions respond in terms of course provision and the supply of employer-specified skills.

- Working with the HEIs and research institutes, create a Strategy for Human Capital Development to increase the supply of knowledge-intensive workers for sectors in which the region has a comparative advantage.

Recommendations for the universities and other HEIs

- Review the institutional profile and education provision to increase inter-disciplinarity, diversify learning methodologies and place the students at the centre of the learning process.

- Actively engage employers in curriculum development, invite professors from industry and encourage employment after the first cycle.

- Address the needs of a diverse student population and link this with the construction of flexible learning paths, which should include tertiary-type B post secondary education.

- Address the need for lifelong learning and more flexible modes of delivery for those who combine work and study.

- Embed compulsory employability skills, work-based learning, internships, entrepreneurialism, Intellectual Property consciousness, etc. in all programmes – including "structured" PhD programmes.

- Systematically monitor student progress, as well as students' labour market outcomes and graduate destinations. In developing quality assurance mechanisms, monitor not only student satisfaction, but also the total student experience, which includes services provided by the higher education institution and asses the quality of higher education, encompassing teaching and learning, curriculum, student life, advising and mentoring.

Notes

1. Poland's cost base is between 20% and 30% cheaper than that of Western Europe, but between 10% and 15% more expensive than that of Romania or Bulgaria.

2. At the beginning of 2011-2012 academic year, 17 institutions were in various stages of liquidation in Poland.

3. Public universities in Wroclaw as of 1 October 2012 (10): University of Wroclaw, Wroclaw University of Technology, Wroclaw University of Economics, Wroclaw University of Environmental and Life Sciences, Wroclaw Medical University, The Eugeniusz Geppert Academy of Arts and Design in Wroclaw, The Karol Lipinski Academy of Music in Wroclaw, Wroclaw University School of Physical Education, General Tadeusz Kościuszko Military Academy of Land Forces, The Ludwik Solski State Drama School in Cracow (branch in Wroclaw). Non-public HEIs in Wroclaw (20): University of Lower Silesia, Wroclaw School of Banking, Pontifical Faculty of Theology in Wroclaw, College of Management "Edukacja", Warsaw School of Social Sciences and Humanities, Faculty in Wroclaw (SWPS), Lower Silesian College of Public Services "ASESOR", International University of Logistics and Transport in Wroclaw, Higher School of Artistic Crafts and Management in Wroclaw, Wroclaw School of Applied Informatics "Horyzont", Academy of Sport Education in Wroclaw, The Philological School of Higher Education in Wroclaw, (12) College of Physiotherapy in Wroclaw, University of Business in Wroclaw (*Wyższa Szkoła Handlowa*), Wroclaw College of Humanities, University of Information Technology and Management "COPERNICUS" in Wroclaw, School of Management and Banking in Poznań (Wroclaw branch), Higher School of Management and Coaching, Non-public Higher School of Cosmetology, Evangelical School of Theology in Wroclaw, Helena Chodkowska University of Management and Law, Wroclaw Campus.

4. This has made Polish public universities more open to "social mobility than several of the largest Western European traditional systems, *e.g.* the French, German or English systems" (Kwiek, 2011a), but only on the basis that socially disadvantaged students are willing and able to pay fees.

5. Hazelkorn (2011) has identified the characteristics of a "world-class tertiary education system": *i)* It provides open and competitive education, offering the widest chance to the broadest number of students; *ii)* it offers a coherent portfolio of horizontally differentiated high performing and actively engaged institutions – providing a breadth of educational, research and student experiences; *iii)* it develops knowledge and skills that citizens need to contribute to society throughout their lives, while attracting international talent; *iv)* it trains graduates that are able to succeed in the labour market, fuel and sustain personal, social and economic development, and underpin civil society; and *v)* it operates successfully in the global market, international in perspective and responsive to change.

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Chapter 3.
Research, development and innovation in Wroclaw

The local and regional dimension of innovation is crucial to promoting long-term economic growth and competitiveness. All cities and regions can improve their capacity to adapt and transfer knowledge to local and regional needs. This chapter examines the effectiveness of current innovation policies and practices in Wroclaw, Lower Silesia and Poland, and the role of research, development and knowledge transfer conducted by the universities.

Introduction

By international comparison, Poland's investment in research and development has remained modest. In 2011, Poland invested about 0.74% of its GDP in R&D. In relative terms, the level of investment has remained the same during the last decade. Half of public R&D is performed within the higher education sector. Less than 0.001% of R&D personnel are employed as researchers in industry (OECD, 2011a). Despite a high volume of foreign direct investment (around EUR 10 billion in 2008 and 2009, EUR 6.7 billion in 2010 and even more in 2011), R&D funding from abroad amounts to less than 5% of BERD (Business Expenditure R&D).

By national comparison, Lower Silesia (known as *Dolnośląskie* in Polish) is characterised by the size of its economy, the weight of its industrial sector and the growing importance of its service sector. Lower Silesia is among the top four regions of Poland in terms of regional gross value-added (GVA). The share of industry in the generation of GVA is estimated at 32.9%, which is the highest in the country and well above the national average (24%). Service sector entities generate almost three-fifths of regional GVA.

At the same time, R&D investments in Lower Silesia lag behind the national average and have a growing focus on innovation investments in manufacturing. R&D spending in the region remains low, with an average of 0.41% of the GDP over the 2005-2010 period, compared to the national average of 0.57%. Less than 20% of researchers work in the private sector. In 2008, Lower Silesia's innovation investments in the service and manufacturing sectors were estimated at EUR 70 million and EUR 525.8 million, which are the seventh and sixth highest results in Poland. Between 2002 and 2008, innovation investments in the manufacturing sector increased by 43%.

In recent years, the conditions for innovation – policy framework, policy mix and funding – have improved at the national and local levels. The national government has launched a new strategy not only to combine innovation and research, but also to set out new orientations in line with the Europe 2020 strategy. A science reform called "Building on knowledge" came into force in 2010 with the aim to create strong research centres that can attract the scientific talent, to develop a special support scheme for young researchers and to strengthen co-operation between science and business. A higher education reform called "Partnership for Knowledge" was voted in parliament and enforced in October 2011 to strengthen the

autonomy of universities, to create stronger performance-based financing for higher education, and to introduce more transparency, accessibility and fairness in funding allocation. At the regional level, the available budget to support innovation activities has increased significantly from EUR 52.7 million during the 2004-2006 period to EUR 529 million during the 2007-2013 period. The overall innovation policy mix has been considerably improved and it now includes measures to support micro-, small and medium-sized enterprises, business R&D activities, financial instruments, business intermediary organisations, science-technology parks and incubators.

In view of these developments, this chapter examines the following four dimensions to assess the effectiveness and coherence of innovation and R&D policies and practices in Wroclaw, as well as the role that the universities play in the local and regional innovation system:

- What is the potential of Lower Silesia and Wroclaw in terms of research capacity and commercialisation, and to what extent are the higher education institutions, the city and the region able to convert this potential into new products, processes, and other kinds of innovation?
- What are the main strategic issues the region and its universities have to face? Do the universities support the local and regional innovation system in an optimal way through internationalisation, industry collaboration and skills development? Are there gaps in delivery where performance could be improved?
- What should universities do to improve the regional innovation system and the innovation performance of the city?
- What are the lessons that can be learned from international experience?

The key message is that Lower Silesia, with its capital Wroclaw, should design a comprehensive innovation strategy. In order to improve the dialogue between the universities and the business sector, better organisation needs to be put in place. There is also a need to promote a more active higher education internationalisation policy that should build on co-operation with neighbouring regions in Germany and the Czech Republic, and extend to more complex relationships with non-European regions. Significant progress should be made in collaboration between universities. While elements of a HE consortium have been established, they lack a clear dynamic. Finally, Lower Silesia should develop a more robust culture of evaluation. It is in the interest of government at all levels that project

management, audits, programme assessments and data collection and processing are improved.

3.1. Higher education potential and Lower Silesia innovation system

Wroclaw and Lower Silesia have a growing potential for regional innovation, but their commercialisation and innovation outcomes could be improved. Higher education institutions with large student numbers and wide array of science and technology fields provide a base for a stronger regional innovation system, but building critical mass and overcoming fragmentation remain challenges. Intermediate institutions have been established to overcome the university-industry barriers and barriers between universities, but have reached their goals only partially. Finally, the region's innovation performances remain modest.

University research capacities

University research capabilities have a strong base in Lower Silesia (*Dolnośląskie*) thanks to a large concentration of higher education institutions and high number of students, particularly in Wroclaw. Lower Silesia ranks third in Poland for the number of students per 10 000 people, behind the capital region (*Mazowiekie*) and the Krakow region (*Malopolskie*). The Lower Silesia region is home to 35 higher education institutions – 11 state and 24 non-state universities – as well as five units of the Polish Academy of Sciences (*Polska Akademia Nauk*) and five state higher professional schools. 80% of the students are trained in the city of Wroclaw. Wroclaw is thus populated by a large number of students who make up more than 15% of the city population.

University research capabilities can build on large student numbers in the two main universities and a few other institutions. The two main universities are the University of Wroclaw (*Uniwersytet Wroclawski*, UW) and the Wroclaw University of Technology (*Politechnika Wroclawska*, WUT), which together enrol a total of almost 70 000 students. UW is the larger of the two institutions, with most of its students enrolled in the fields of economy and law, philology and social sciences, whereas only 15% of the UW students are trained in the fields of science and technology. WUT, the region's leading university in science and technology in terms of student enrolment, has a strong focus on applied sciences, but maintains a strong base in basic R&D (see Box 3.1). Other important universities include the University of Economics (*Uniwersytet Ekonomiczny we Wroclawiu*) (17 000 students), the University of Environmental and Life Sciences (*Uniwersytet Przyrodniczy we Wroclawiu*, WUELS) (10 000 students) and

the Medical University (*Uniwersytet Medyczny im. Piastów Slaskich we Wroclawiu*) (3 500).

Box 3.1. Research strengths at the Wroclaw University of Technology (WUT)

The Wroclaw University of Technology (*Politechnika Wroclawska*) is the successor of the German *Konigliche Technische Hochschule* of Breslau established in 1910. It was re-established as the Wroclaw University of Technology in 1945 with inputs and staff from the Lwów University of Technology. In 2011, WUT enrolled 33 000 students and 2 000 academic staff across 12 faculties and departments, making it the largest employer in the City of Wroclaw. 1 000 PhD students are being trained at WUT.

The WUT budget amounted to EUR 133 million in 2010. 27.5% of the total budget is dedicated to research. Over the period of 2007-2013, WUT is expected to receive EUR 170 million from the EU Structural Funds.

WUT is engaged in scientific research activities as part of a framework programme financed by the EU Structural Funds, the Lower Silesian Executive, the National Centre in Krakow (NCN), the National Centre for R&D (NCBiR), the Foundation for Polish Science (FNP), the Ministry of Science and Higher Education (MniSW), or by businesses. It operates in collaboration and as a stakeholder of the Wroclaw Technology Park, the Lower Silesian Innovation and Science Park, and the Technology Park in Walbrzych.

WUT provides flexible offers for companies searching innovative solutions. It can mobilise an extensive network of R&D centres and certified labs supplying research and testing equipment and facilities. CAMT (the Centre for Advanced Manufacturing Technologies) is a centre of excellence specialising in mechatronics, vision machine research, materials test and production systems that is part of this network. Other centres include the CAMAN (Advanced materials and nanotechnology), the Centre for Biomedical engineering, the Wroclaw Centre for networking and supercomputing and the Centre for Advanced Materials and Nanotechnology.

In 2011, WUT generated 3 746 publications indexed in the ISI database and ran half of the invention projects of Lower Silesia. It applies for 100 to 300 patents annually and responded to 179 company research orders in 2011. Its academic incubator for entrepreneurship hosts 45 student companies.

Source: Wroclaw University of Technology (Politechnika Wroclawska) (2012), "Presentation I," PowerPoint presented at OECD Review Visit, Wroclaw, 22 February 2012.

UW and WUT, Wroclaw's leading universities in science and technology, cover a broad spectrum of technological research, making it difficult to reach the critical mass in many technology fields and leading to fragmentation of research capabilities. UW trains students and researchers in areas such as biological science, biotechnologies, chemistry, earth sciences and environment, mathematics and physics. WUT, with 58 fields of study, adds architecture, civil engineering, electronics, robotics, energy, mining, mechanical engineering, machine building, materials, photonics, etc.

By international comparison, aggregate RDI performances for WUT and UW are relatively modest. According to the Scimago classification 2012 (an international ranking based on research performances), WUT appears at the 609th rank and UW at 928th rank (among 3 000 research institutions in the world) in terms of output (publications). This ranking places WUT and UW below the University of Krakow and the University of Warsaw in terms of quantity, quality of publications, excellence and leadership (see Table 3.1).

RDI output of WUT is half of that of Polytecnico di Milano (a university similar in size and orientation) and the citation performance is inferior. (OECD, 2011b) Both WUT and, to a lesser extent, UW are less active in international co-operation than the University of Sevilla and the University of Granada, which are located in Andalusia, a rapidly developing region in Spain (OECD, 2010).

Table 3.1. Ranking of Polish and Wroclaw universities in the Scimago Classification (2012)

Ranking	University	Output (O)	International Collaboration (IC) (%)	High Quality Publications (Q1) (%)	Normalised Impact (NI)	Specialisation (Spec)	Excellence (Exc)	Leadership
383	U Jagellon (Krakow)	8 494	39	41	1	0.6	8.7	5 382
534	U of Warsaw	6 271	47.8	47.2	1.1	0.7	10.1	3 336
556	Warsaw U of Technology	6 010	28.2	28.4	0.9	0.8	8.5	4 152
609	Wroclaw U of Technology (WUT)	5 563	28	27.2	0.8	0.8	6.6	4 199
790	A. Mickiewicz University	4 181	35	39.4	0.7	0.7	4.7	2 617
863	N. Kopernikus University	3 757	29.7	34.5	0.7	0.7	5.2	2 548
928	U of Wroclaw (UW)	3 460	29.8	40.5	0.8	0.7	6.1	2 112

Note: Universities are ranked according to their publication output (O) i.e. the total number of documents published in scholarly journals indexed in Scopus (see column 3). IC (International collaboration) in column 4 is the institution's output ratio produced in collaboration with foreign institutions. Q1 (Column 5) stands for high quality publication. It is the ratio of publication that an institution published in the most influential scholarly journals of the world. For NI i.e. normalised impact, the value shows the relationship between an institution average scientific impact and the world average (Column 6). A NI score of 0.8 means that the institution is cited 20% below world average. Spec (column 7) is a specialisation index. This index indicates the extent of thematic concentration/dispersion of an institution's scientific output (1 for the most concentrated, 0 for the most dispersed). Exc (column 8) index measures the amount in % of an institution's scientific output that is included in the set of the 10% of the most cited papers in their respective scientific field. It is a measure of the high quality output of a research institution. The last column indicates an institution's output as the main contributor, that is the number of papers in which corresponding authors belongs to the institution.

Source: SCImago Institutions Rankings (2012), "SIR World Report 2012: Global Ranking", SIR World Report 2012, *www.scimagoir.com/pdf/sir_2012_world_report.pdf*.

Commercialisation

In order to improve commercialisation and to move from research to innovation, the Lower Silesia region has created "downstream" intermediate institutions. These intermediate institutions now form a relatively well-developed network that embraces academic entrepreneurship incubators, four science-technology parks, and the technology transfer centre of the Wroclaw University of Technology (Wroclaw Centre for Technology Transfer WCTT).

WCTT provides a broad range of services in entrepreneurship, commercialisation and technology transfer. WCTT supports academic entrepreneurship assisting in starting and continuing business activities. For example it prepares feasibility studies for projects planned by the regional and economic stakeholders, as well as higher education institutions. WCTT assists in the commercialisation of the research results and supports the preparation of project proposals to be financed under the EU FP7. WCTT provides a wide range of technology transfer services, including the preparation of technology audits, identification of existing technologies and solutions, matching between the technology transfer parties, and participation in the negotiations of agreements. Since its inception in 1995, WCTT has signed 60 technology transfer agreements, realised 300 technology and innovation audits, performed 15 000 consultations related to technology transfer, IPR and commercial co-operation, and supported 149 innovative start-ups.

Although inter-university co-operation in RDI is challenging, universities in Wroclaw have taken steps to engage in collaborative efforts to boost RDI. The Lower Silesian Centre for Advanced Technologies was created by a consortium of Wroclaw universities and local companies. The initiative was focused on the following four areas: advanced materials; computer science; renewable energy sources and life quality i.e. clean technologies, biotechnology, pharmaceutics, health food production technologies. The Lower Silesian Academic Incubator of Entrepreneurship (*Dolnośląski Akademicki Inkubator Przedsiębiorczości*, DAIP) is another collaborative effort that involves UW, WUT, WUELS and the Wroclaw Technology Park.

The Wroclaw Research Centre EIT+, which is financially supported by the city, has made efforts to overcome institutional barriers with only partial success. Wroclaw Research Centre EIT+ was developed in 2006 with support from the Ministry of Regional Development, the Ministry for

Science and Higher Education, the city of Wroclaw and the regional government of Lower Silesia, which provided endowment capital and other investments. The initial phase (2006-2008) consisted of a major investment in organisation and portfolio development to furnish a robust base for WRC services. In 2008, due to conflicting ideas about the status of the WRC endowment and IPR, WRC interactions with the WUT came to a standstill. As a result, the WRC agenda focuses on its core business of implementing the EIT+ portfolio of projects, while expanding it with additional IT operations and activities related to Wroclaw's participation in EIT's Climate KIC's Regional Implementation Community. Despite WRC's management capacity and strong backing from the City of Wroclaw, university collaboration remains limited to only core EIT+ portfolio projects, where WRC's role has been similar to that of a special purpose vehicle.

Innovation performances

In innovation performance, Lower Silesia on average lags behind the best performers in Poland and the neighbouring German and Czech regions, but achieves better scores for employment in high tech manufacturing. Within the framework of the European Innovation Scoreboard (EIS), Lower Silesia belongs in the fourth group of "medium-to-low-innovation performers" and it scores at 137th place.[1] For the innovation environment *i.e.* "enablers"[2] and "innovation output", Lower Silesia is a medium-to-low-innovation-performer but for "firm activities" [3] it is a low performer. At the same time, Lower Silesia outperforms the capital region (*Mazowieckie*) for the intensity of collaboration between small firms and for innovation diffusion.[4] Given the importance of manufacturing activities, Lower Silesia's employment in high tech manufacturing and its share of technological innovation is also higher (see Table 3.2). The capital region is, nonetheless, ahead of Lower Silesia in all the other innovation indicators. The neighbouring regions of Sachsen-Anhalt (Germany) and of Prague (Czech Republic) rank higher than Lower Silesia in all other aspects apart from high tech manufacturing jobs (in relative terms).

Table 3.2. European Innovation Scoreboard indicators for selected regions (2006)

	Lower Silesia	Mazowieckie	Sachsen	Dresden	Prague
Tertiary education	0.38	0.53	0.45	0.68	0.48
Broadband Access	0.31	0.34	0.30	0.34	0.43
Public R&D	0.37	0.63	0.64	0.96	0.77
BERD	0.33	0.40	0.41	0.72	0.60
Non R&D innovation	0.62	0.41	-	-	0.32
Innovation SME int.	0.32	0.22	-	-	0.58
SME collaborating	0.48	0.56	-	-	0.55
EPO Patents	0.17	0.17	0.36	0.55	0.27
Technological innovation	0.29	0.28	-	-	0.61
Employment Hi-Tech manufacturing	0.41	0.27	0.32	0.58	0.30
Employment KIS	0.29	0.52	0.4	0.55	0.81

Source: Hollander, H., S. Tarantola, and A. Loschsky (2009), "Regional Innovation Scoreboard (RIS) 2009," Pro Inno Europe Paper No. 14, Pro Inno Europe INNOMETRICS, *www.proinno-europe.eu/sites/default/files/repository_files/10/03/I981-DG%20ENTR-Report%20RIS%20(Web).pdf*.

The EU Innovation Monitor (RIM) places Lower Silesia in the group of "Knowledge-absorbing regions"[5] together with other regions in Eastern Europe and southern Italy (Kroll *et. al*, 2011). On average, Lower Silesia lags behind the EU averages in all three factors of innovation performance patterns, with particularly low score for "Innovative entrepreneurship", which is lower than the scores for "technological innovation" or "public knowledge". The share of innovators, both technological and non-technological, is small and the high score on non-R&D innovation expenditure signals that innovation is mostly the result of absorbing already existing knowledge.

3.2. Challenges

Lower Silesia, with its capital Wroclaw, should develop a comprehensive regional innovation strategy that addresses the need for smart specialisation and the role that universities can play in the regional innovation system. Cross-border collaboration could be a springboard to greater global engagement and could be enhanced with the help of universities and by bridging the gap between science and industry. WRC EIT+ aims to achieve this, but its ambitious agenda raises challenges. Universities are an important supplier of graduates, but have not yet succeeded in adequately responding to local industry demand for skills.

Deficit of technicians and engineers persists in a number of professions. This trend, together with the weak involvement of Wroclaw's companies in innovation investment, contributes to the relatively low performance of the regional innovation system (RIS) in terms of the generation of new products and processes.

Strategic thinking

Lower Silesia, with its capital Wroclaw, would benefit from a well-designed strategy for innovation. While the Polish policy environment for RDI is favourable to a certain extent (as shown by the relatively strong "enabler" indicator in the European Innovation Scoreboard), the need to consolidate the achievements made and to increase efforts are recognised at the EU and national levels. Lower Silesia grew at a rapid pace in the pre-crisis period, although at a rate below the national average,[6] and was hit hard by the financial crisis. In this context, the *voivodship* needs to improve the efficiency of its economic policy and strengthen its innovation programmes.

In 2006, Lower Silesia developed a strategy for the period of 2007-2013 to improve the external conditions for the construction of the regional innovation system (RIS), but this strategy had some shortcomings, including the lack of focus on higher education (Marshal Office of the Dolnoslaskie Region, 2006). The strategy identified many issues that constrain the development of the RIS: the weakness of the research sector, the difficult interaction with SMEs, the lack of financial means, the high unemployment in many non-urban areas, the obsolescence of equipment, the shortage of skills, the low level of organisational advancement and the lack of strategic thinking. The strategy made few references to the role of universities, apart from acknowledging the challenges in mobility and industry collaboration. In general, the strategy did not define or quantify its goals. Regional comparative advantages were not analysed.

Box 3.2. Universities and the regional innovation strategy: challenges and principles

Stronger interaction and collaboration between universities and the cities and regions in which they are located bring benefits to both parties. Universities benefit from:

- increased enrolment from the local population
- improved local funding and partnership opportunities for research and teaching
- additional income from services provided to local business through consultancy and professional training
- increased social capital support; and resource-sharing opportunities, *e.g.* infrastructure and knowledge workers.

Cities/regions benefit from:

- Generation of tax and other revenues
- Global gateways to attract inward investment and talent
- New businesses generated by university staff and students; advice and expertise
- Enhanced local human capital though graduate retention, professional continuing education and lifelong learning
- Content and audience for local cultural programmes.

In many cases, these cities/regions are "innovation poor", while universities are "innovation rich".

Two practical steps can bring the universities and cities/regions together in a productive, effective partnership:

First, cities/regions need help in crafting world class development strategies. This help could partly come from the universities and partly from national and provincial policies, which create and support development tools for cities/regions that want to compete in the global economy. These tools include analytics that diagnose competitive advantages and best practices in regional governance that help regions establish sustainable partnerships across public and private sectors, which helps a region think and act as a region.

Box 3.2. Universities and the regional innovation strategy: challenges and principles (continued)

Public policies can play a pivotal role in committing resources to providing these type of tools and creating public incentives for cities/regions to form and craft sensible development strategies. A critical element of the new generation of local and regional policies is requiring cities and regions to prioritise investments in public goods and investments in order to ensure that public funds are invested in alignment with the local/regional development strategy. .

Second, universities should find new ways to organise their innovation through the lens of regions and this can be helped by public policies. A forum in which universities, cities/regions and public policy meet can help explore the local/regional market for innovation. Cities and regions must know what innovation they need. This is the "ask" in the innovation market. Universities must know what innovation they can provide to regions. This is the "bid" in the innovation market. Public policy can play a role in creating a market where the "bid" and the "ask" meet. Public policy can help regions discover a whole set of tools and technical support. Public policy can also help universities develop the "bid". They can provide funding incentives that encourage universities to catalogue research with a regional lens in mind. For example, research programmes that lead to specific economic gains might receive bonus funds in subsequent years.

Source: OECD (2007), *Higher Education and Regions: Globally Competitive, Locally Engaged*, OECD Publishing. doi: 10.1787/9789264034150-en.; Drabenstott, Mark (2007), Introductory remarks presented at the conference Globally Competitive, Locally Engaged: Higher Education and Regions, OECD/IMHE, Valencia, Spain, 19-21 September

A recent document "RIS for Lower Silesia Voidvodship 2011-2020" (Marshal Office of the Dolnoslaskie Region, 2011) integrates a number of improvements, with a stronger focus on clusters, technological platforms and open innovation. Lower Silesia's sectoral strengths are identified, but have not been analysed in detail. Universities are, nevertheless, recognised as brokers between the science sector and the manufacturing and service industries. Elements of the strategy include the development of entrepreneurship in higher education, consideration of the needs of employers, R&D support and assistance to endogenous development of innovation.

Despite the efforts made, articulating a comprehensive innovation strategy remains a challenge in the region for two reasons: i) the strategy should be oriented towards smart specialisation. Resources are scarce and need to be allocated to industries and technologies for which Lower Silesia

and Wroclaw have the best chances to be competitive internationally and ii) precise targets should be defined for the purpose of regular assessment in order to correctly and efficiently execute the strategy. The contribution of the university sector to regional innovation should be properly taken into account, as this is an area where major improvement could be achieved.

Cross-border dynamics

Cross-border development is a dimension of the strategy that has not yet received sufficient attention in Wroclaw and Lower Silesia in terms of ambition and the mobilisation of resources. Although there are some references in the policy documents to the Wroclaw/Dresden/Prague triangle, these co-operations seem vague and embryonic. The Wroclaw Self-Evaluation Report is not very detailed about co-operation with Germany and is completely silent about possible Czech partners. WUT has signed numerous collaboration agreements with foreign education institutions, usually in the form of Memorandums of Understanding that establish loose collaborative frameworks. These frameworks are inadequate to fill the gaps in joint innovation projects between Lower Silesia, Sachsen Anhalt and the Prague region. Contrary to several examples in Europe, *e.g.* the case of Öresund (Box 3.3), ambition for cross-border collaboration in Wroclaw and Lower Silesia appear limited and the mobilisation of resources is insufficient.

Wroclaw Research Centre has expressed the desire to strongly contribute to cross-border collaboration with Germany and the Czech Republic, but more efforts are needed develop concrete co-operations. EIT focuses on the Dresden-Prague-Wroclaw technology triangle (DPWt) in order to stimulate successful commercialisation of technology and science across neighbouring and strategically-aligned regions in Central Europe. Achievements have been restricted to a "commercialisation forum" that involves a business-friendly magazine, a newsletter, a tablet viewer and a social media network.

Box 3.3. Öresund "bi-regional" universities and their involvement in clusters

With a total of 20 universities and 130 000 students, the Öresund region (composed of the Zealand region in Denmark and the Skania region in Sweden) has many strengths in the education and research sector, but its most significant asset is probably the co-operation links that have been developed over time between the HEIs. This long-term, informal cooperation was formalised in 1997 with the creation of the Öresund University. This institution has been a leading actor not only in formal scientific research and education (Oresund science region), but also in the creation of institutions to promote informal networking activity and information sharing for economic activities. Working in collaboration with researchers, business leaders and policy makers throughout the region, the Öresund University has helped in identifying critical driving growth clusters and facilitating the development of networking associations in each of these clusters. These organisations – Medicon Valley Academy (MVA), Öresund IT Academy, Öresund food network and Öresund Environment – are already playing an important role in promoting integration across the region and are showing a great deal of promise for the future.

Initially publicly funded, Medicon Valley Academy (MVA) has become a membership organisation. Universities and public hospitals pay for 55% of membership fees. A PhD programme involving 12 students is part of the MVA and aims at strengthening co-operation between public institutions and private companies for product development. While catalysed by the Oresund University and significant public sector funding, MVA has now developed a dynamic of its own.

IT Öresund is a co-operative organisation for the cross-fertilisation of IT actors and the development of the IT cluster. In co-ordination with MVA, IT Oresund has developed a cross-border, post doctoral programme building links between information technology and biotech.

Öresund Food Network was founded with the goal of creating synergies between public and private research and among companies to establish the Öresund region as one of the world's most dynamic agro-alimentary regions.

Öresund Environment is a similar organisation building links in a triple helix mode and working in the field of traffic and air, optimised environmental system, construction industry and food.

Source: OECD (2010), *Higher Education in Regional and City Development: Andalusia, Spain 2010*, OECD Publishing. doi: 10.1787/9789264088993-en.

Wroclaw participates in a wide range of INTERREG programmes, but could make stronger efforts to focus on cross-border development with the neighbouring regions in Germany and the Czech Republic, and to engage universities in these collaborations. The city benefits from several INTERREG IV C programmes, but they are not especially focussed on co-operation with the neighbouring regions and they do not concern the Czech regions. KNOW MAN is a project about knowledge network management and tech parks associating the *voivodship*, Wroclaw Technology Park, and Italian and Spanish partners with several Berlin institutions, notably the Humboldt University (budget EUR 2 million). The Sachsen Anhalt Ministry of Environment is the leader of ENERCITEE *i.e.* a European network of experiences and recommendations that helps cities and citizens to become more energy efficient (EUR 4.7 million). Another relevant programme for the Wroclaw region is DISTRICT, which aims at disseminating innovation strategies for the capitalisation of targeted good practices, which also involves Saxony and regions in the UK, Sweden and Italy (EUR 4.6 million). Finally, the B3 Region programme concerns the enhancement of broadband projects (EUR 3 million). Few universities participate in these different programmes.

Stronger efforts are needed to promote the internationalisation of universities and to align internationalisation with regional development goals. Given that the local market is too small for the EIT+, it has started to establish a number of links with foreign universities and, notably, to get in touch with Polish expatriates or Polish-born professors. At the university level, professors and researchers have made connections with their peers outside of Poland but on an individual basis and in a scattered way. Wroclaw universities have no real foreign policy for research. As a consequence, they are not very active or successful in capturing FP7 funds and efficient ROP innovation money. Repercussions from Wroclaw-related INTERREG programmes are scant. Co-operation with neighbouring regions should be the first step for better organised and more efficiently targeted internationalisation. Since EIT+ programme has strengthened its regional co-operation, both with regional partners in Poland and across the border, such experience could be used as a springboard for interregional co-operation between HEIs. The Öresund case (see Box 3.3) could also be a source of inspiration for new initiatives to improve the governance of inter-regional associations (creation of inter-regional committees, etc.).

Bridging the gap between science and business

Bridging the science-business gap remains a challenge for the internationalisation of Wroclaw and Lower Silesia. The scope and intensity of co-operation with other European regions and beyond depends on the

capacity of the Wroclaw and Lower Silesia authorities to strengthen the quality of their R&D and to improve the coherence and the market relevance of their research projects. So far this has proven to be difficult. Despite major brand-building efforts like the EIT+ bid in 2008, Wroclaw needs to improve its track record based on broader peer recognition in this regard. This is crucial to attracting global, knowledge-based businesses to the region. Some large ICT companies have abandoned their project to establish their research centre in city. Wroclaw was a candidate for the establishment of a European Institute of Technology, but it was not selected.

University-industry co-operation (UIC) in research is an important vector of innovation and growth, and one of the avenues to foster a dynamic research sector while strengthening the "third mission" of universities. Poland's share of UIC contracts in total FP6 contracts with Polish partners is 30%, *i.e.* weaker than in the Czech Republic (42%) or Germany (38%). In WUT, 10% of research is contracted by business. Generating more market-oriented research would be the best way to enhance innovation-based R&D investment in Poland and Wroclaw. The national government could grant special advantages or incentives to collaborative research projects.

There is room for promoting a more market-oriented business model of the university technology transfer offices (TTOs), making them more efficient and responsive to market requirements and improving research project management and marketing. Despite some collaborative initiatives with industry, often led and developed by entrepreneurial academics, university researchers, in general, are not well prepared to undertake industry collaboration and universities do not provide sufficient support for these activities. As a result, universities do not sufficiently engage in commercialisation. Foreign investors remain uninterested in the university TTO services and hardly use the regional R&D potential. The local business sector requires technical support rather than research, but universities as institutions are not well organised to respond to these demands. For example, the Technology Transfer Centre of the Wroclaw University of Technology (WCTT) offers training for companies in production methods and organisation. It also supports the introduction of quality control systems and international transfer of technology.

Universities can also contribute to local innovation through the so-called "forum function" by taking the lead in organising conversation with local industry practitioners (See Box 3.4). Within that framework, universities should concentrate on the key features of local industries. This means that instead of a one-size-fits-all approach to technology transfer, they should develop a more comprehensive, differentiated view of their role in the local economy (Sotarauta and Lester, 2007).

Box 3.4. Developing public space in universities

In most cases, the indirect support provided by universities for local innovation processes is likely to be more important than their direct contributions to local industry problem solving. In addition to educating and raising the skill level of the local population, a university can also play an important role by providing a public space for on-going conversations with local industry about the future direction of technologies, markets and local industrial development.

This public space role can take many forms, including meetings, conferences, industrial liaison programmes, standards forums, entrepreneur/investor forums and visiting committee discussions of departmental curricula. The conversations between university and industry people that occur in these spaces seldom focus on solving specific technical or commercial problems, but often generate ideas that can become the focus of problem-solving both in industry and in universities. The importance of the public space role of the university and its contribution to local innovation performance is frequently underestimated and underdeveloped by tertiary education institutions.

Source: Lester, R. (2005), "Universities, Innovation and the Competitiveness of Local Economies, A summary report from the Local Innovation System (LIS) Project: Phase 1," IPC Working Paper Series, Industrial Performance Center, MIT, Cambridge, MA, *http://web.mit.edu/ipc/publications/pdf/05-010.pdf*.

Wroclaw and Lower Silesia have a number of weakly integrated clusters that are often organised around an association of members or are endowed with a co-ordination structures. Universities in Wroclaw could take advantage of these structures to embark on a more structured conversation and engagement. The central government could help to promote a pilot experience in Wroclaw by providing a guide to experiences that have been developed in other countries (*e.g.* helping to select animators in the clusters specifically in charge of the university/cluster interaction).

EIT+ bridging the gap between science and industry?

EIT+ was created in 2007 as a response to the challenge to bridge the gap between science and business. The EIT+ initiative was a major effort to co-ordinate regional development policy for 2007-2013 in the area of innovation and research in Wroclaw and Lower Silesia. The Mayor of Wroclaw took up the role of co-ordinator, which included organising meetings and negotiating with the national government representatives on behalf of the EIT+ group. The immediate impulse to call up the group was

linked to Poland's bid for the European Institute of Innovation and Technology.

Core investment in the EIT+ strategy includes the Wroclaw Research Centre EIT+ (WRC EIT+) (EUR 140 million), nanotechnologies and advanced materials (EUR 30.1 million), biotechnology/advanced medical technologies (EUR 27.6 million) and the Technical Library for Innovative Economy (EUR 25.25 million). WRC EIT+ Ltd. manages three of these projects and employs highly qualified specialists in these fields in order to facilitate the implementation of applicative projects and technologies developed in the Lower Silesia Centre for Materials and Biomaterials labs (*Dolnośląskie Centrum Materiałów i Biomateriałów*, DCMiB), among others, based on the development of start-ups or spin-off companies. Thirteen spin-offs based on unique IP have already been established.

Box 3.5. The EIT+ Project

The EIT+ programme developed in Wroclaw (2006-2013) is the concrete implementation of a proposal of the Polish national development strategy at both the metropolitan and regional level.

The initiative was originally linked to Poland's bid to host the headquarters of EIT, as well as to host one of EIT's Knowledge and Innovation Communities (KICs). This has been reflected in the proposed name of the programme "EIT+". The key objective of the programme is to optimise the use of the city's and the region's social and financial resources in accordance with the Lisbon Strategy, *i.e.* adapting development strategies to the knowledge-based economy and knowledge society goals.

The letter of intent establishing the Wroclaw Research Centre EIT+ was signed in April 2007 between six original stakeholders. Pre-agreement was signed in October 2007 for all the core EIT+ portfolio projects. The Wroclaw Research Centre EIT+ founding act was signed after the ratification process in stakeholder organisations in November 2007. Project work was handed over to company stakeholders from the Wroclaw Agglomeration Development Agency (*Agencja Rozwoju Aglomeracji Wrocławskiej*, ARAW), which managed the preparatory works on behalf of the City of Wroclaw.

The mission of the EIT+ Programme is to undertake initiatives and to create favourable conditions for close co-operation between partners from the research, economy and business sectors in the field of advanced materials, nanotechnologies and biomaterials. The Centre's research potential is based on three virtual Centres that already exist in Wroclaw: the Centre for Advanced Materials and Nanotechnology, the Biomedical Engineering Centre and the Centre for Bio-monitoring, Biotechnology and Protection of Lower Silesian Ecosystems.

Box 3.5. The EIT+ Project (continued)

The core financing for research programme comes from the EU structural funds for 2007-2013. Other sources are: national schemes, EU initiatives (FP7), public-private partnerships and a key commitment from business. Several core projects for implementation of the EIT+ programme were prepared in 2006/2008 within the framework of EIT+ Initiative and by the Lower Silesian Centre for Advanced Technologies. All together, the EIT+ programme will be supported in the 2007-2013 perspective by the Innovative Economy Operational Programme with EUR 200 million. The core research projects of the EIT+ Programme are in the implementation phase.

The Wroclaw Research Centre EIT+ Ltd is the beneficiary of the projects. It is a limited company founded by seven stakeholders (two territorial government bodies and five HEIs) and mandated to manage the EIT+ core projects. Its endowment includes real estate from the City of Wroclaw and capital from all the stakeholders, the City of Wroclaw and Lower Silesian Executive providing staple capital.

EIT+ Ltd has signed several memoranda of understanding and agreements with foreign partners such as Technische Universitat Dresden (ECEMP), IBM Zurich, University of Louisville, CEITECH Brno, REC, Fraunhofer Dresden, Carl Zeiss Jena, and Nokia Siemens Networks. The Wroclaw Research Centre EIT+ is also a member of international organisations, including EARTO, EIRMA and HyER.

The Wroclaw Research Centre EIT+ is a corporate partner in a consortium of six major European regions working with five of Europe's top universities, including Imperial College and ETH Zurich, and ten major companies, including CISCO, Shell, Thales and Bayer, in a ground-breaking initiative on climate change called Climate KIC.

Within the EIT+ programme, particular attention is given to establishing appropriate support for small and medium innovative enterprises, especially those originating from the local academic community. The companies led by young Wroclaw citizens operating on the market of financial services and internet technologies are already in the lead in Poland. They soon will be joined by bio-tech and nano-tech "spin-offs" and "start-ups". New entities have already been established by the Wroclaw Research Centre EIT+ in 2011 within the framework of the capital fund available in the "Accelerator EIT+" programme. The EIT+ fund signed an agreement with Israeli Venture Capital GIZA.

Source: Miller, Miroslaw (2011): Regional Innovation System in Lower Silesia, Key Role of Wroclaw Research Centre EIT Plus Ltd, Wroclaw University of Technology, Wroclaw.

The most important task of the Wroclaw Research Centre managing company is to design and realise the Lower Silesia Centre for Materials and Biomaterials project (DCMiB) within the new Pracze Campus. Its ultimate goal is to create a research and development centre and equip it with research infrastructure to facilitate high quality research in the fields of biomedicine and nanotechnology.

The ambitious EIT+ Project targets a broad spectrum of research in high tech fields. Priority tasks in DCMiB (See Box 3.5) extend to state of the art materials and nanotechnologies for photonics, microelectronics and sensors, lanthanides, functional polymers and composites as well as to biotech and advanced medical technologies focussing on preclinical tests of new drugs, molecular diagnosis and bio-molecular models An accelerator on hybrid technologies has been launched to take advantage of the multidisciplinary potential of the Institute[7] . Finally, a platform A2B (Academia to Business) has been set up to help industrial partners access knowledge exchange and share experience and joint R&D activities.

While the EIT+ Project can count on EU support and on a substantial influx of funding, its comprehensive programme raises a number of issues. First, EIT+ may be pursuing too many objectives, while neglecting to respond to the local and regional business needs. Second, EIT+ is strongly science-based and it will not be easy to generate research leading to broad-based patented innovations and spinoffs on this basis. Third, the aim is to deliver world-leading innovation through collaboration between all the actors in the "innovation chain" and to contribute to the creation of Knowledge and Innovation Communities (KICs). Collaborations with universities and particularly WUT seem arduous, notably at the top management level, because of cultural differences and strategic conflicts. The risk of investment duplication might be more important in that context. Fourth, instead of putting the focus on a limited number of niches, EIT+ prioritises investments in large segments of research and multiple projects. This tendency might result in funds being stretched too thin. Although the Climate-KIC is marginal to WRC's activities, it provides an example of the funding distribution. The core of the Climate-KIC will involve four research and innovation programmes on the themes of climate science, low carbon cities, bio-renewable processes and integrated water management. At the same time, Climate KIC will use the range of projects being developed by the regions, such as electric urban mobility, as its test-bed and pilot new innovations in developing the low carbon economy. Climate KIC will also run a high-flyer academic programme and a practitioners' programme to develop new generations of high-skilled specialists in the low-carbon economy (so called "Pioneers into Practice"). It might be questioned

whether a EUR 5 million annual budget (as it is announced) is sufficient to finance such a large mandate.

Lack of technicians and engineers

Given the level of economic growth, the insufficient number of qualified staff, engineers, technicians and other specialists is a threat to the economic and social development of Wroclaw and the wider region. As a result of the national and foreign investments, 40 000 new jobs have been created in the last five years in the Wroclaw metropolitan area. This number will reach 100 000 in the near future. Inflow of employees from outside the city and the region can be only a partial remedy for serious staff shortages. The education sector requires strengthening, especially in the technical, scientific, natural sciences-related and economic fields (See Box 3.6).

The risk of business relocation due to growing labour costs could be addressed also by creating a more business-friendly environment that is strongly connected with the academic sector and by ensuring the development of research laboratories of the companies.

Box 3.6. Labour market mismatch in Poland

Poland suffers from a poor match between the structure of higher education and the needs of the labour market. Students in Poland are currently studying more than 200 courses of study. Most students study economic and administrative courses (23%), social sciences (13.9%), teaching (12%), the humanities (8.8%), engineering and technical (6.8%), medicine (5.8%), IT (4.9%), services (3.7%), legal (3.1%) and environmental protection (1.4%) (16.4% fall within the category of "other courses"). These preferences suggest that the segment of humanities and social sciences is excessively developed. Consequently, the biased structure of education reduces the added value of higher education in Poland. This is because Polish employers primarily need engineers and ICT specialists, as well as graduates in construction and transport and specialists in the physical sciences and mathematics.

Source: Polish Ministry of National Education (2011), "Implementation of the Strategic Framework for European Cooperation in Education and Training (ET2020): Poland-National Report 2011," European Commission, *http://ec.europa.eu/education/lifelong-learning-policy/doc/natreport11/poland_en.pdf.*

Wroclaw has a shortage of skilled workers and professional groups, as well as mismatch between qualifications and employers' expectations, partly as a result from enhanced activities in the IT industry, industry-relevant services and laboratory research activities and partly from the construction

boom and ageing demographics. Qualified workers are in demand in professions such as roofer, assembler, and mechanic, but also engineers. According to "Forecast of the Labour Market and Demands for Qualifications" there is a lack of brokers, physicists, chemists, porters, painters, carpenters, drivers, gastronomy workers, production line operators, computer scientists, secretaries, security personnel, shop assistants, architects, engineers, babysitters and elderly carers, specialists of health care, and teachers of professional subjects (Wiktorska-Święcka *et al.*, 2009). Business Process Off-shoring (BPO) companies investing in, Lower Silesia are in a need of office staff[8]. Due to the building boom before EURO 2012, the employment demand for architects and builders has also increased. The ageing of society will increase the employment opportunities for caretakers of the elderly. The number of employed people in agriculture and heavy industry will decrease with the development of the service sector and its share in GDP.

In Lower Silesia, many initiatives, particularly in ICT fields, aim to improve the dialogue between enterprises and universities to better align education provision with labour market demands. Universities, mainly WUT, have embarked on an ambitious investment programme to address the expected increased demand for computer scientists and graduates from technical studies. Nearly 10 000 IT students are trained in WUT, 85% of the total, and 1 588 graduate each year (89% from WUT). There is also a high demand for graduates from primary and secondary vocational schools, particularly given that there are a limited number of such schools in Lower Silesia. Unfortunately, according to the available forecast for the nearest years, the situation is likely to deteriorate as the number of graduates from such schools will decrease drastically (Osadiacz, 2009).

Loose regional innovation system

The Wroclaw and Lower Silesian regional innovation system (RIS) operates in a region with a diverse industry structure. Despite a strong university presence and a great number of students, Lower Silesia remains an industrialised region with a wide variety of industrial clusters. Industrial clusters include large firms such as the AGD for household appliances[9] or the automotive cluster that also integrates smaller entities[10]. Others like the LG industrial cluster correspond more to the "hub and spike" type (*i.e.* a large firm and its subcontractors). Many are SME-based and concerned with traditional industries such as wood construction (SIDE cluster), heating and biomass systems (Renewable energy cluster), mineral resources (Cuprum) and welding and cutting tools machines, matrix forging and electrotechnic equipment (Cinnomatech).

While the regional innovation system can take advantage of this diversity, its dynamism depends on the intensity of the linkages between the knowledge suppliers (HEIs, research centres) and the business sector. Territorial government, academic leaders, and HE authorities have promoted regional dialogue through standing bodies and one-off initiatives. One salient example of regional dialogue is the prominence of key liaisons between industrialists and academics with non-traditional academic experience. For example, the Lower Silesian Council for Entrepreneurship and Science is driven by academics with good business contacts or who are engaged in business stakeholder associations (Business Centre Club). The head of Wroclaw Technology Transfer at WUT is an established opinion leader in entrepreneurship, innovation and market-driven research. Smaller forums exist, but they are usually a part of a research project or an EU cohesion policy grant. The Wroclaw Agglomeration Development Agency (*Agencja Rozwoju Aglomeracji Wrocławskiej*, ARAW) and the Wroclaw Academic Hub (*Wrocławskie Centrum Akademickie*, WAH) support the collaboration of universities and business, acting as a broker and a liaison office in day-to-day operations that originate from ARAW's business support programmes.

Despite many efforts and initiatives, the Wroclaw and Lower Silesian regional innovation system is underperforming. While representing about 8.1% of Poland's GDP, Lower Silesia R&D spending is only 6.4% of the total investment in the country. In Poland, business-funded R&D in the higher education sector and government sector has decreased by more than half in relative terms since 1999 and is now around 5%. This figure might even be lower in Wroclaw and its region where many large firms are multinationals working for export markets and not so inclined to invest locally in R&D. Currently, firms with foreign capital account for 27% of the number of firms in Wroclaw.

A number of reasons explain the relatively weak links in the Wroclaw and Lower Silesian regional innovation system. First, HERD is low in Poland, about 0.2% of GDP in 2008 (half the OECD average). In the business sector the share of innovative firms (within the total number of firms) is about half of the European average (see Eurostat, 2010). According to ERAWATCH in 2010, 91.1% of Polish SMEs do not co-operate with public research organisations and universities. Absorptive capacities of the business sector and particularly small and medium-sized enterprises are low. Second, innovative investment by firms and HEIs goes, for the most part, to technology and equipment purchase to bridge the gap with their competitors in more advanced countries. Insufficient availability of good quality capital and equipment is often detrimental to research cooperation. Third, Wroclaw has a bias towards IT as a legacy of world class mathematical research (by

S. Banach, S. Ulam in Lvov and H. Steinhaus) and a critical mass of highly qualified engineers in the private sector in IT, which is conducive to university-industry collaboration. It is estimated that one-third of IT software production and services in Poland originates from Lower Silesia. Linkages with HEIs are, nevertheless, more difficult to establish in non-hi-tech and more traditional industries and clusters. Fourth, communication between the different higher education institutions remains suboptimal and constrains co-operation.

Intermediary organisations in the Wroclaw and Lower Silesian regional innovation system are new and often still at an embryonic stage. There are three technology parks in Wroclaw and three incubators (in the main universities). The most important one, Lower Silesia Academic Incubator (*Dolnośląski Akademicki Inkubator Przedsiębiorczości*, DAIP), offers real estate services, legal and accounting services, support for the preparation and evaluation of business plans and various advisory services. In 2011, DAIP was host to 21 firms created by graduates, 4 founded by students and 7 by academic staff.

Partnerships

The City of Wroclaw and the Lower Silesia regional authorities have made efforts to promote their collaboration with universities and partnerships between universities. The Wroclaw Academic Hub (WAH) is a municipal programme aiming at engaging HEIs in city development. It is a co-operative platform that fosters the development of science and university education in the cityWAH's collaboration has been established with a number of partners, particularly Wroclaw Research Center EIT+ Ltd, UWr, UE and University of Life and Environmental Sciences. Wroclaw Research Center EIT+ Ltd itself is a venture that includes the city and five main universities as shareholders. Despite these initiatives, collaboration between HEIs remains a challenge because of the bureaucratic management of the universities and the inertia of decision makers. A number of collaborative programmes have been launched thanks to the EU and the national government, but they have not triggered more robust collaboration, which remains project-based and often ends with the conclusion of the programmes (EU programmes, international co-operation, etc.). The government could take steps to examine and introduce frameworks for co-operation, such as the Science City, which could remedy the lack of continuity and insufficient degree of internalisation. Box 3.7 describes the Science City Foundation in Stockholm that could be a useful benchmark for action, as it represents a good example for universities' engagement in a local Triple-Helix initiative, or cluster and network activities that aim to initiate concrete co-operation projects.

Box 3.7. Stockholm Science City Foundation

In 1990, the Stockholm Science City Foundation (SSCI) was founded and commissioned by the three leading universities (*Karolinska Institutet*, KTH Royal Institute of Technology and Stockholm University), the two cities (Stockholm and Solna) and the county and the business sector. The Science City Foundation's mission is to attract academia and business in the field of life sciences to Stockholm and neighbouring Solna and to develop the life sciences sector in the new city area developing around Karolinska Institute (Hagastaden) by attracting academia and businesses. The aim of the region, Vision 2025, is to become the world's most attractive centre for life sciences.

The Stockholm Science City Foundation is a tool for its stakeholders to facilitate the implementation of joint projects and marketing of Stockholm Life (*www.stockholm-life.se*), to make the region attractive for academic and industrial life sciences in a regional, national and international context. According to its self-stated mission, it is a Triple Helix initiative aimed at the exchange of knowledge between academia, local policy makers and the private sector, and at leveraging the critical mass of life science competences in the three leading universities. In 2011, the foundation had 12 employees, many with a doctoral degree. Its concrete activities involve facilitating the preparation of joint projects, such as by helping interested researchers and managers to gather information and to access sources of funding. Additionally, it helps the universities set-up interdisciplinary research programmes.

The Stockholm Science City Foundation also strives to maintain active network relations with other life sciences initiatives outside the region and local initiatives with another focus of activity – to be able to provide access to the right networks for all possible queries. Examples include: Sweden Bio, Uppsala Bio, Biotechvalley.nu, Stockholm-Uppsala Life Science, KI, Vinnova, MaRS Discovery District, Stockholm Chamber of Commerce, Invest in Sweden Agency, Stockholm Business Region.

The Stockholm Science City Foundation has successfully initiated a number of development projects, which are administered by SSCI, including ABC Europe, Albano area, EU Bridge, Powerhouse Stockholm Life, North Station development, Stockholm Brain Institute, Sweden Science Net, and Tools of Science. Many initiatives are ERDF co-financed, some have an inter-regional and/or international scope.

Source: Kroll, H., E. Baier, and T. Stahlecker (2012), "Thematic paper 4: The Role of Universities for Regional Innovation Strategies," Regional Innovation Monitor (RIM), *www.rim-europa.eu/index.cfm?q=p.file&r=94c05a1956e77cb12e5ed86b21f8ff15*.

Conclusions and recommendations

In Poland and Lower Silesia, research suffered from the restructuring of higher education and R&D institutions, and their adaptation to market conditions during the transition to the post communist era. In recent years, public R&D has been re-institutionalised with the support of the higher education reform.

In Lower Silesia and Wroclaw, universities are the largest R&D investors in the region, despite the shortage of funds. A number of R&D intermediates and pro-innovation institutions have been established to help the commercialisation of HE research. The launching of the EIT+ programme is an endeavour to bridge the gap between science and industry. Partly thanks to these efforts, Lower Silesia is number one in Poland for intellectual property management. Since the OECD review visit, the Association of Business Services Leaders in Poland published its second report, which covers 2011. It is worth noting that Wroclaw's share of R&D is exceptionally high – the highest proportion of R&D in the services sector in the nation. Wroclaw has been named for the second time as the most R&D-intensive city in Poland (Górecki *et al.*, 2012).

By international comparison, Lower Silesia's technology transfer performance remains weak and patenting activities relatively modest. Universities seem to lack the strategic knowledge necessary to plan their regional engagement in RDI. They remain relatively passive in the international arena and weakly embedded in cross-border initiatives with Germany and the Czech Republic. The Wroclaw Research Center EIT+ Ltd and its network could offer a framework for developing regional co-operation with other European countries, but it is often considered by universities as a competitor for funding from the EU, the central government or the city.

While the higher education sector is an important supplier of graduates, the institutions have not yet succeeded in responding adequately to local industries' demand for skills. Deficit of technicians and engineers persists in a number of professions. This trend, together with the weak involvement of Wroclaw companies in innovation investment, contributes to the relatively low performance of the regional innovation system (RIS) in terms of the creation of new products and processes.

In contrast to leading countries and regions in Europe, Wroclaw and Poland have not yet developed a robust evaluation culture, which makes it difficult to get feedback from projects, to monitor them and to improve their management. Assessment of projects and programmes appears insufficient and defective. There is a lack of factual analysis, limited collection of data

and a lack of tradition of processing them. Poland lags behind most European countries where evaluation of schemes to promote technology transfer or to create networks generally refer to the number of business ideas screened and the number of development products generated, but also stress the need for complementary initiatives. In the case of university start ups, incubators and science parks, indicators include the capacity of the programme to set up large partnerships and to accede to private funds which are usually supposed to take over public funds after a few years. The number of universities involved, or firms and jobs created are often quoted as element of success. More sophisticated analysis includes questionnaires addressed to customers or cost benefit analysis of programmes.

Lower Silesia and Wroclaw need to lift up their innovation profile to close the gap with their competitors in Western Europe. In the "race towards the top", universities have a major role to play not only as R&D providers but also as agents of regional economic growth. They could actively support entrepreneurialism among faculties and graduates. They have the capabilities to enhance their consultancy offer, to leverage knowledge from technology transfer and from marketing project outcomes, to manage incubators and science parks and to set up public-private partnerships with large companies. Due to the current scattered initiatives of universities and the fragmentation of institutions and research, changes have been slow to materialise. National, regional and local authorities can help catalyse these changes, providing that they adopt clear policy orientations and implement a coherent set of policy initiatives. In that context, the OECD review team recommends that the following measures be taken to improve local and regional innovation:

Recommendations for national and local policy

- (City and the voivodship) Develop comprehensive, well articulated and designed evidence-based innovation strategies that clearly stress the role of the higher education sector as crucial in leveraging regional potential, harnessing local talent and knowledge and activating networks of stakeholders. (This is particularly important in a country where a dominant share of the R&D is performed by the universities.) Focus attention on the contribution of universities to entrepreneurship, their capacities to provide services (consulting, transfer of technologies, placing), to develop efficient innovation infrastructure (incubators, science parks) and to increase their participation in seed capital funds and public-private partnerships. Prioritise a limited number of activities and segments of supply chains where the city and the region have relative comparative

advantage as well as make efforts to model the "ask" and "bid" market (Box 3.2). Build a vision for the future, set (measurable) goals and milestones, and establish a metrics that will allow identify whether these goals are reached.

- (National government and the voivodship) Strengthen collaborative research, develop HEI business forum function and foster cluster-related policies. University-industry co-operation (UIC) in research is an important vector of innovation and growth, and one of the avenues to foster a dynamic research sector while strengthening the "third mission" of universities. Poland's share of UIC contracts in total FP6 contracts with Polish partners is 30% i.e. smaller than that of Czech Republic (42%) or Germany (38%). To enhance market-oriented, innovation-based R&D investment in Poland and Wroclaw, consider granting special advantages or incentives to collaborative research projects. Promote universities' "forum function" by providing a guide about experiences that has been developed in other countries, such as helping to select animators in the clusters specifically in charge of the university/cluster interaction.

- (National government and the voivodship) Link into appropriate European innovation support machinery, including Euro region and cross-border projects. In collaboration with the universities, develop a robust internationalisation strategy for the university sector that embraces research, education and service in order to help capture FP7 funds and ROP innovation money. As the first step, prioritise co-operation with neighbouring regions by co-ordinating joint university efforts, building on the experience of the EIT+ programme**,** which has strengthened regional trans-border co-operation and collaboration with the regional partners in Poland. Draw on world class examples of cross-border collaboration, such as the Oresund Science Region (see Box 3.3), notably in terms of governance arrangements (creation of interregional committees etc.).

- (National government and the *voivodship*) Promote more a market-oriented business model of the technology transfer offices and improve research project management and marketing. Improve the business model of technology transfer offices to make them more efficient and responsive to market requirements. Ensure (national and local governments) that sufficient assistance goes to the modernisation of Technology Transfer Offices in order to secure the

recruitment of individuals with market experience and industry background.

- (The City and the voivodship) Review and systematise collaboration among HEIs and boundary-spanning collaboration between research departments. Upgrade the governance of the regional innovation system. Define frameworks for co-operation among HEIs, and between HEIs and key stakeholders that could remedy the lack of continuity and insufficient internalisation of collaboration, drawing on successful examples such as the Science City Foundation in Stockholm.

- (Government at all levels) Promote a more robust culture of evaluation of RDI. Learning from the well-developed evaluation practises of Germany, Finland, Sweden, the UK or the US, launch a general evaluation programme assessing the Polish innovation policy and build a methodology that could help regional authorities to evaluate their own initiatives. Consider launching a pilot project in Lower Silesia.

- (City and national government) Seek to encourage greater collaboration between universities through programmes, joint investments in R&D facilities and incentives. Encourage university specialisation and promote international, national and regional networking.

- (City and the voivodship) Clarify the roles of different institutions (e.g. the Wroclaw Agglomeration Development Agency, EIT+, Wroclaw Technology Park, Lower Silesian Innovation Park and university-based technology transfer organisations and incubators) in the Wroclaw and Lower Silesia regional innovation system.

- (National government) In collaboration with universities, construct an overall monitoring and evaluation system that would cover a wide range of regional development issues with a special focus on innovation-relevant activities. This should be supported by a coherent and informative system of indicators for the measurement of the regional contribution of universities. The system should be able to collect information at the organisational level, the university level and the regional level. Collaborate with the regional and local government and universities to improve the evidence basis for regional and institutional decision making through the collection, monitoring and analysis of robust data. Define common university indicators, guarantee transparency of results, strengthen the

monitoring and follow up the success of the programmes and improve the public dissemination of results.

- (National government) To improve productivity and innovation in traditional industry and services, align the ongoing programmes of the national, regional and local governments with the region's needs and establish special mobility programmes to link students, graduates, post-graduates and academic staff with local businesses and industry in a more systematic way. Models for linking postgraduate students with local industry include the Knowledge Transfer Partnership Scheme in the United Kingdom that has improved the competitiveness of companies through the introduction of some form of innovation or new technology; around 75% of postgraduate associates are offered jobs in the companies.
- (National government) Review the state of collaboration in the university sector to provide an opportunity for universities to rethink their priorities and to specialise.

Recommendations to universities

- Develop a more comprehensive, differentiated view of the university's role in the local economy instead of one-size-fits-all approach to technology transfer. Develop the "forum function for industry" by organising conversation with local industries in meetings, conferences, industrial liaison programmes, standards forums, entrepreneur/investor forums, visiting committee discussions of departmental curricula, taking advantage of the co-ordination structures or member associations of existing clusters. Perceive creation of better jobs as the focus of innovation activities. Ensure that Technology Transfer Offices assume a wider role in collaboration with industry and fully play their role in cementing the value chain, strengthen them with professional staff.
- Align RDI activities to address the needs and demands of the existing and emerging local clusters, industries and a wider society. Develop a practical engagement with business and a collaborative way of referring enquiries from businesses and industry with the help of virtual and face-to-face collaboration.
- Develop an institutional strategy to internationalise research, development and innovation and to access a larger share of FP7 funds and ROP innovation money. Systematically strengthen international collaboration to improve RDI outcomes, building on the connections driven by individual academics and EIT+.

Notes

1. EIS divides the 228 European regions into five groups according to their relative R&D performance: high performing, medium to high, average, medium to low and low performing regions.
2. "Enablers" capture the main drivers of innovation that are external to the firm.
3. In the European Innovation Scoreboard, innovation performances are assessed against a number of indicators distributed in three groups: the first one measuring the capacity of enablers, the second estimating firm innovation efficiency and the third measuring innovation outputs.
4. Expenditures for non-R&D innovation (i.e. expenditures such as machinery, equipment, acquisition of patents) are often considered as a proxy for innovation diffusion.
5. Group n°2 of knowledge-absorbing regions contains 49 European regions. Other groups are Group n°1: Balanced innovating regions composed of 42 regions; group n°3: Public knowledge regions (21 regions); group n°4: Knowledge-absorbing innovating regions (19 regions, notably Greece and Portugal); group n°5: industrialised innovating regions in particular in France, Spain and Sweden; group n°6: High-tech business innovating regions (12 regions); and group n°7: Business innovating regions in Northern Italy and Austria (11 regions). This classification, albeit interesting, is incomplete and leaves out of the picture 22% of European regions.
6. LS GDP grew from 27% between 2004 and 2008 against 30% for the whole country.
7. The EIT is presently involved in 30 co-financed projects and it is managing 11 patent applications.
8. The BPO sector includes bookkeeping, financial services, IT services and R&D work

9. Notably with Elektrolux, Whirlpool, Fagor Mastercook and LG Electronics.

10. With companies such as Toyota, Volvo, Volkswagen, Bosch, Faurecia, WABCO, etc.

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Chapter 4.
Towards creative economy and social cohesion

Social and cultural development is a crucial aspect in the development of cities and regions. It supports economic growth, improves community health and welfare and promotes social cohesion. This chapter outlines the ways Wroclaw's higher education institutions (HEIs), including the academies of fine art, music and theatre, contribute to the creative economy and social cohesion of Wroclaw and Lower Silesia. The chapter then identifies the major challenges for HEIs and the city in bridging the gap between the broad policy objectives of the European Capital of Culture and the capacity and capability of the institutions to help reach those objectives. The chapter concludes with recommendations on how HEIs can modernise and transform their educational provision, research and community engagement to ensure that the vision of the Capital of Culture is firmly embedded and sustained.

Introduction

Many cities throughout the world recognise the economic and social benefits of the creative economy and are implementing policies to promote cultural and creative industries that emphasise the access to skills and creative people. In large cities such as London, New York, Berlin, Barcelona, Melbourne and Toronto, as well as smaller urban centres like Wroclaw, the development of the creative economy has become a strategic priority. The cultural and creative industries generate wealth and employment opportunities, regenerate neighbourhoods, facilitate innovation and problem-solving, and shape the city's identity to face the global competition for talent, investment and recognition. Creative and cultural activity also offers a tool for community development and engagement, providing opportunities for disadvantaged neighbourhoods and social groups.

The city of Wroclaw has identified creativity and culture as central elements of its social and economic development strategy and seeks to use the status of European Capital of Culture to achieve a change in its urban development trajectory. In recent years, the city of Wroclaw has invested EUR 2.5 billion in infrastructure, mobility and cultural, business and sport venues that have transformed Wroclaw into a city with a strong sense of history and place, and a dynamic view of its future. In partnership with its regional stakeholders, the city has led the successful bid for the title of European Capital of Culture and is now building the infrastructure and developing the calendar of events for 2016. The Wroclaw Agglomeration Development Agency (*Agencja Rozwoju Aglomeracji Wrocławskiej*, ARAW) is driving the cultural and creative industries and expects HEIs to play a more proactive role. The European Capital of Culture is a major opportunity to capitalise on Wroclaw's multi-cultural traditions and to mobilise culture for social and economic development, boost innovation and enhance social cohesion.

Box 4.1. Wroclaw - European Capital of Culture 2016

The application for the European Capital of Culture 2016 presents an ambitious agenda and set of objectives, based upon nine separate goals:

- Reclaiming Wroclaw's historic place at the crossroads of Europe.
- Building a new identity of multiple cultures.
- Drawing attention to Wroclaw's architectural heritage that accounts for 25% of Poland's historic sites, *e.g.* three UNESCO World Heritage sites.
- Unravelling Wroclaw's past.
- Overcoming social exclusion.
- Creating public spaces of authentic arts.
- Overcoming the political and economic isolation of the former communist era.
- Interacting with the opportunities of cyberspace.
- Raising the consciousness of all citizens about their duties and responsibilities towards nature.

Source : Wroclaw 2016 (2011), "Spaces for Beauty, revisited: Wroclaw's Application for the title of European Capital of Culture 2012," Wroclaw 2016: European Capital of Culture, Wroclaw, *www.wro2016.pl/fileadmin/user_upload/application/application_revisited_en.pdf.*

The ambitious plans for the future are in contrast with present realities in Wroclaw, which, despite rapid economic development, features relatively low social capital, social and economic exclusion and limited participation in culture. The city of Wroclaw portrays itself as a venue for civic engagement, multiculturalism and creativity, with cultural and creative industries making up a growing share of the regional GDP. However, 6%-7% of the Wroclaw population participates in cultural activities presently, which are mostly confined to the city centre. Wroclaw's inner city and

suburbs include pockets of social and economic exclusion, and inner city decay. Employment in the cultural and creative industries in Lower Silesia remains low when compared with international leaders: the arts, entertainment and recreation sector currently employs only 6 000 people or 1.7% of the region's population.

Finally, the potential of higher education institutions to contribute to Wroclaw's social, cultural and environmental development has not yet been fully exploited. The education provision in arts and culture in Wroclaw has not yet fully capitalised on the potential of the cultural and creative industries. Despite some collaborative multidisciplinary efforts that connect Wroclaw University of Technology (*Politechnika Wroclawska,* WUT) or the University of Wroclaw (*Uniwersytet Wroclawski*) with art academies, the education provision in arts and culture remains, in general, traditional and supply-led. Co-operation between the city, the universities and various arts academies is in need of strengthening.

In the context of these challenges and opportunities, and to sustain the longer term socio-economic impacts of the Capital of Culture, this chapter examines:

- What is the contribution of the universities and academies of fine art, music and theatre to Wroclaw's cultural development?
- Are these institutions appropriately targeted to address the key challenges and opportunities in terms of the creative economy and social cohesion? Are there gaps in delivery?
- What lessons can be learned from international experience?

This chapter begins by outlining the important role that the cultural and creative industries play across countries. It then reviews the provision of education and research in the field of arts and culture in Wroclaw, identifying the traditional and supply-led approach as a challenge and advocating multidisciplinarity, collaboration and stronger labour market focus. The chapter also reviews the efforts made by the local and regional authorities, as well as universities and art academies in response to the needs of the creative economy and social cohesion. It highlights Wroclaw's city-driven projects that capitalise on the local potential in creative fields, and boost cultural tourism and urban regeneration. It advocates stronger efforts to engage universities and arts academies in these efforts. The chapter identifies the design, proliferation and duplication of higher education facilities as key issues for Wroclaw's creative economy. It advocates for greater collaboration in higher education space management and a long term strategy for Wroclaw's physical environment, including a cultural quarter in

Wroclaw. Finally, the chapter provides detailed recommendations for public authorities at different levels, for universities and for art academies.

4.1 Cultural and creative industries

This section outlines the important role that the cultural and creative industries play across countries. It shows that the cultural and creative industries hold great potential for cities like Wroclaw, which are seeking to diversify their economies, due to their continuing growth.

The cultural and creative industries make a significant contribution to employment, economic growth and capital regeneration. Their contribution to the GDP is estimated to range from 2% to 6%, depending on the definitions used (UN, 2010)[1]. In 2010, the sector contributed around 2.6% of the total GDP of the EU, providing jobs to 5 million people across the 27 EU member states. The cultural and creative industries grow at a higher pace than the rest of the economy and provide many different and often highly skilled job possibilities. In Europe and elsewhere, the sector also drives innovation and ICT sectors (KEA European Affairs, 2006). The cultural and creative industries contribute to the local and regional economies through attraction and retention of talent and knowledge-intensive businesses, which tend to move to cities with a high concentration of talent and creative workers. The attraction of talented people helps provide a fertile ground for a competitive business climate which in turn will help attract high-tech firms and generate economic growth (Florida, 2002).[2]

Box 4.2. Cultural and creative industries

There is no agreement on a single definition of the cultural and creative industries. The broad definition of cultural and creative industries include arts organisations and museums, media content and multimedia companies, ICT, the film and television and entertainment sector. The cultural and creative industries include not only the visual and performing arts or the city's marketing strategies for cultural tourism built around museums, theatres and theme parks, but also a growing range of new products and services which connect ICTs, science and engineering, and business.

Since the 1980s, culture and the arts has become an important vehicle for urban development which has emphasised the role of cultural and creative industries. This change has helped to broaden the understanding of the arts and culture, and to distinguish between "Established Arts" (visual art, design, crafts, theatre, music, museums) and "Cultural and Creative Industries" (broadcasting, film, recording, software, television and radio, heritage sector, online publishing and new media products, games interactive, leisure software).

Box 4.2. Cultural and creative industries (continued)

The convergence of multimedia and telecommunication technologies has led to an integration of the means by which creative content is produced, distributed and consumed. This has fostered new forms of artistic and creative expression. Digital technology provides the mechanism by which the productive base of the local and regional economy can be expanded by transforming established arts into commodities of a cultural and media industry.

Employment and wealth creation sectors contiguous to arts and culture include:

Cultural industries: film, TV, printing/publishing, music, theatre, dance, architecture and design, visual arts, museums, etc.

Content sector: companies/businesses that combine music, audio-visual and information/data services using new digital delivery technology and skills: digital media, games, television, social media, advertising, etc.

Multimedia Sector: content development, web design and associated services, internet service providers plus multimedia hardware manufacture.

Information and Communications Technology: software development and applications.

Entertainment Support Services: film, TV, music, sports, drama, hospitality/tourism.

Source: Hazelkorn, E. (2001a), "The Dynamics of Cultural Production in Ireland: Economic Strategy, Digital Technology and Public Policy Making," in K. Ernst, M. Halbertsma, T. Ijdens and S. Janssen (eds.), *Trends and Strategies in the Arts and Cultural Industries,* Barjesteh & Co's, Rotterdam.; Wroclaw 2016 (2011), "Spaces for Beauty, revisited: Wroclaw's Application for the title of European Capital of Culture 2012," Wroclaw 2016: European Capital of Culture, Wroclaw, *www.wro2016.pl/fileadmin/user_upload/application/application_revisited_en.pdf*.; UN (United Nations) (2010), *Creative Economy Report 2010. Creative Economy: A Feasible Development Option*, United Nations, *http://unctad.org/en/Docs/ditctab20103_en.pdf*.

Leading cities and city regions have sought to develop the creative and cultural industries, partly capitalising on the skills developed in their higher education and art institutions. In Toronto, creative industries represent around 6% of the total labour force. In Melbourne, industries and cultural activities are strongly connected to universities (Melbourne Vice-Chancellors' Forum, 2007). The government of Singapore has made concerted efforts to transform Singapore into a hub of cultural and creative industries in South East Asia. In London, creative industry employment is estimated at 658 000 in 2010, with more than 100 000 high-skilled people

working in software and electronic publishing. In Amsterdam, the number of people working in the cultural and creative industries increased 6.6% during the period of 2006-2009 (UN, 2010). In Dublin, the City Region has made joint efforts with the education sector to reposition itself as a European knowledge economy hub through a network of spatial and sectoral clusters that attract creative talent and investment (Dublin City Council, 2009). In Berlin, the Senate has capitalised on Berlin's image as an open, diverse and tolerant city by establishing a number of support mechanisms for the creative industries and by encouraging collaboration of art education institutions (See Box 4.4).

Despite the global economic crisis, the cultural and creative industries continue to grow. In 2008, the world financial and economic crisis caused a drop in global demand and a contraction of 12% in international trade. World exports of creative goods and services continued to grow, reaching USD 592 billion in 2008, more than double the 2002 level, indicating an annual growth rate of 14% over six consecutive years (UN, 2010). Governments continue to encourage the cultural and creative industries that have the potential to deliver significant social and economic benefit, with powerful "spill over" effects for other sectors leading to innovative products and services (CIE, 2009; NESTA, 2012).

The continuing growth of the cultural and creative industries is a confirmation that the sector holds potential for cities like Wroclaw that seek to diversify their economies by expanding into one of the most dynamic sectors of the world economy.

4.2 Wroclaw's arts education scene

This section reviews Wroclaw's provision of education and research in arts and culture, with focus on multidisciplinary approaches, labour market relevance, innovation and enterprise. It identifies the traditional and supply-led approach to education and research as challenges. It advocates stronger multidisciplinary and collaborative efforts, and focus on graduate employability, RDI and graduate enterprise to benefit not only the institutions and their students, but also Wroclaw and Lower Silesia.

Providers of arts and arts-related education

Arts and arts-related education in Wroclaw is provided by dedicated arts academies and universities such as the University of Wroclaw and the University of Lower Silesia (*Dolnoslaska Szkola Wyzsza*).

The three main arts academies in Wroclaw - The Eugeniusz Geppert Academy of Fine Arts and Design (Akademia Sztuk Pieknych im. Eugeniusza Gepperta we Wroclawiu) (2012), Akademia Sztuk Pieknych we Wroclawiu (Academy of Arts and Design), the Karol Lipiński Academy of Music in Wroclaw (*Akademia Muzyczna im. Karola Lipinskiego we Wroclawiu*), and a branch of The Ludwik Solski State Drama School in Cracow (*Panstwowa Wyzsza Szkola Teatralna im. Ludwika Solskiego*) - are relatively new institutions established in the 1940s, which together host about 1% of all students in Lower Silesia. They provide a strong university education in the main arts disciplines. Study programmes have been reconfigured to meet Bologna criteria, bachelor, masters and, to lesser extent, doctoral opportunities (Box 4.3.).

Box 4.3. Arts Academies in Wroclaw

The Academy of Fine Arts (*Akademia Sztuk Pieknych im. Eugeniusza Gepperta we Wroclawiu*), was established in 1946 to provide education in painting, drawing and sculpture, followed shortly thereafter by ceramics, glass, wood and metal. This institution has had a strong focus on training designers for reviving the glass and ceramics industries. After 1949, the institution subsequently became known as the National Academy of Fine Arts and in 1996 the Academy of Fine Arts. It has four faculties: Department of Painting and Sculpture, Graphic Design and Media, Ceramics and Glass, and Interior Architecture and Design – and other complementary studies in the Departments of Art History and Philosophy, and Foreign Languages. A new study programme in Multimedia is in development.

Karol Lipiński University of Music (*Akademia Muzyczna im. Karola Lipinskiego we Wroclawiu*) was established in 1948 as the National Higher School of Music. Its educational system follows conventional standards, offered by four main faculties: Instrumental, Vocal, Music Education, and Composition, Conducting, Theory of Music and Music Therapy.

This institution also offers classes in foreign languages. The Academy trains about 600 students at any one time – instrumentalists, vocalists, conductors, composers, music theorists, music therapists, teachers, church musicians and organisers of musical life – who acquire knowledge and skills which enable them to work in different music-related professions.

Box 4.3. Arts Academies in Wroclaw (continued)

The Ludwik Solski State Drama School in Cracow (*Panstwowa Wyzsza Szkola Teatralna im. Ludwika Solskiego*) was established in 1946 in Krakow offering a three-year training course in drama for prospective actors. In 1949, its name was changed to the State College of Acting (*Państwowa Wyższa Szkoła Aktorska*), and the curriculum extended to four years; in 1955, it became the Ludwik Solski State Drama School in Cracow. While the main campus offers acting, theatre directing and dance, the branch campus in Wroclaw offers acting and puppetry. Since 1946, about 1 000 students have graduated.

Source: Academy of Fine Arts in Wroclaw (Akademia Sztuk Pieknych im. Eugeniusza Gepperta we Wroclawiu) (2012), Akademia Sztuk Pieknych we Wroclawiu (Academy of Fine Arts in Wroclaw), *www.asp.wroc.pl/english/index_e.htm*.; The Karol Lipinski Academy of Music in Wroclaw (Akademia Muzyczna im. Karola Lipinskiego we Wroclawiu) (2012), Academy of Music: The Karol Lipinski Academy of Music in Wroclaw, *www.amuz.wroc.pl/language/en*.; Ludwik Solski State Drama School in Cracow (Panstwowa Wyzsza Szkola Teatralna im. Ludwika Solskiego) (2012), Panstwowa Wyzsza Szkola Teatralna Im. Ludwika Solskiego w Krakowie (National Theatre School of Ludwik Solski in Krakow), *www.pwst.krakow.pl*.

Multidisciplinarity

Internationally, growing multidisciplinarity in the arts has translated into new institutional arrangements in arts education.[3] Diverse models of the "University of the Arts" have been developed in Berlin in 2000, London in 2008 and Zurich in 2009. Berlin has also received national recognition for establishing a number of collaborative centres in arts education, such as the Co-operative Jazz Centre in Berlin (2005) and the Co-operative Dance Education Centre (2006) (Box 4.4).

Box 4.4. Creative industries in Berlin

Berlin is one of the most attractive cities for the creative class. The Berlin Senate has defined creative industries as a profit-oriented segment. The Steering Committee for the Communication, Media and Creative Industries Cluster has developed a strategy for the creative economy. The Berlin Investment Bank (IBB) and the Berlin Partner GmbH support creative business. The *Kulturprojekt Berlin GmbH* champions marketing efforts for cultural and creative ventures by offering tailored services to cultural and creative industries. An information platform for businesses and artists (*www.creative-city.berlin.de*) and a museum portal facilitate collaboration.

Berlin's creative industries are supported by four internationally-renowned art schools, universities, universities of applied sciences, technical colleges, 36 vocational schools and non-public education and training providers. The higher education institutions provide a broad range of study programmes for both "creative professionals" in management, business, finance, law and health care, and the "creative core" who works with computers, architecture, arts, science and education. In addition, HEIs offer dedicated studies in performing arts, such as jazz courses by the Jazz Institute Berlin (JIB) and contemporary dance courses by the Co-operative Dance Education Centre.

The Jazz Institute Berlin was established in 2005 through a merger of the jazz departments of the Berlin University of the Arts (UdK) and the Hans Eisler College of Music. This bundling of capacities has enhanced the institution's status in the international creative scene. The JIB helps each student to find his/her own artistic identity as a jazz musician. In addition to musical knowledge of a diverse, cross-cultural variety, international networking offers students important professional points of contacts. The Berlin Jazz scene and the music industry benefit from the JIB. For the winter semester, the JIB moves to its own building, which has a 300 person concert hall, a professional sound studio, rehearsal rooms and a café.

The Co-operative Dance Education Centre was created in 2006 at the initiative of the Berlin Senate as a collaborative effort of the Berlin University of the Arts and the Ernst Busch School of Performing Arts to integrate education and vocation in contemporary dance and choreography. The centre is financially supported by the Berlin Senate, the Foundation for Cultural Training and Consultation, and Tanzplan Deutschland.

Source: OECD (2010a), *Higher Education in Regional and City Development: Berlin, Germany 2010*, OECD Publishing. doi: 10.1787/9789264089846-en.

Countries have supported mergers of education institutions to capitalise on the benefits of the cultural and creative industries. For example, in Finland, Aalto University was conceived on the merger of the University of Art and Design, the Helsinki School of Economics and the Helsinki University of Technology, which combined Finland's leading institutions in design, technology and marketing with a strong focus on innovation and graduate enterprise. This merger was actively promoted by the Finnish industry and the Ministry of Education (see Box 4.5). The Irish government has recently commissioned a study of education and research provision in the creative arts and media in the Dublin region in order to review possible synergies between the different institutions, and their potential for greater economic impact.

Similar initiatives are not yet visible in Wroclaw or Poland in general, but the situation is likely to change in the future due to the levelling of the student demand. The national or local authorities could consider commissioning a study of education and research provision in arts and media in order to review synergies between different institutions and their potential for greater economic and social impact.

Box 4.5. Cultural and creative industries' impact on higher education: Aalto University

The rise of the cultural and creative industries and new technology has blurred the boundaries between traditional art fields and creative multidisciplinarity, new disciplines and new kinds of institutions. The arts, which traditionally have been defined by their disciplinary boundaries that have been replicated and reinforced by different academies in fine arts such as music and theatre, have come together in new and innovative ways. These new arts include performance art, musical theatre, scenography, soundscape, etc. Developments in new technology have led to the new fields of multimedia, digital media, electronic arts and electronic music/computer music that have significantly impacted and transformed the art disciplines by creating new disciplines and new kinds of institutions. The arts are taught not only in traditional arts academies, but in classical universities, universities of applied universities, polytechnics and universities of technology. For example, Dublin Institute of Technology enrols the largest numbers of students in visual, performing and media arts.

Box 4.5. Cultural and creative industries' impact on higher education: Aalto University (continued)

Aalto University in Finland was founded in January 2010 as a result of a merger of the Helsinki University of Technology, the Helsinki School of Economics and the University of Art and Design Helsinki that aimed at creating an institution where science and arts meet technology and business to create a multidisciplinary, integrated seedbed for innovation. This flagship project was part of a restructuring of the university sector in Finland that concentrated funding and academic efforts. The university, which is located in Espoo and Helsinki, was named after Alvar Aalto, Finland's pioneer designer and architect, but its working title was "Innovation University". The creation of Aalto University was facilitated by the launch of new university legislation that introduced greater efficiency, business links, accountability and freedom to raise external funding.

Source: Aalto University (2012a), Aalto University, *www aalto.fi/en*, accessed 16 July 2012.

In Wroclaw, the multidisciplinary and collaborative efforts in arts education are in early stages, with some promising initiatives. New initiatives that build on collaborative efforts and multi-disciplinarity in arts education include*: i)* interdisciplinary programmes in multimedia or design developed by the Academy of Fine Arts in collaboration with Wroclaw University of Technology (WUT); *ii)* Music Therapy developed by the Karol Lipinski Academy of Music and the Wroclaw Medical University (Uniwersytet Medyczny im. Piastów Slaskich we Wroclawiu) *iii)* an interdisciplinary programme in transport design and digital media between the Academy of Fine Arts and WUT; and *iv)* a new programme in scenography between the Academies of Fine Art and Theatre.

In general, however, Wroclaw's higher education institutions and arts academies maintain a traditional approach to education, and lack multi-disciplinarity and collaborative efforts. Educational programmes, curriculum and pedagogy are organised along the demarcation between arts disciplines. There is a lack of inter-disciplinary activity within the institutions and institutional collaboration, either between the different arts academies or with other universities. While space management could provide ways to introduce interaction between disciplines, each of Wroclaw's art academies is now building its own new facilities.

Labour market relevance and employability

International experience shows that the fine arts, music, theatre and media provide only limited labour market opportunities in traditional careers (Hazelkorn, 2001b; Anonymous, 2012). The labour market opportunities for arts graduates, depending on discipline, tend to be a combination of self-employment, freelance, casual or working in SMEs with less than ten employees. Most arts graduates combine their creative practice with some form of teaching either in an institution or private capacity.

Despite the high levels of skill that art practitioners typically have, their financial reward and job security in the labour market tends to be relatively low. Recent UK data shows that while all higher education graduates have higher salaries than non-graduates, arts graduates have the lowest salaries of all (Sedghi, 2012). As sole traders or as workers on casual hire or short-term contracts, art practitioners lack the industrial power or business acumen to make a reasonable living and to receive an equitable reward for their work (UN, 2010). Many creative workers live at or below the poverty line, supported by the hidden subsidy of their family or social welfare. As a consequence, arts workers are often subject to inadequate recognition of rights and benefits. Furthermore, female participation in cultural and creative industries is growing rapidly in subsectors (PR, advertising, magazine publishing, radio, arts administration) leading to negative results in recruitment, pay, promotion and career structure.

At the same time, there are growing employment opportunities for arts graduates who are flexible, multi-skilled and able to work in cognate fields. For example, there is labour market demand for commercial and industrial designers who can help develop and upgrade technology products, or respond to the growing need for pleasant healthcare facilities for patients and aging population; or graphic designers who are able to meet the demand for Internet advertising and interactive media. While actors are subject to fluctuations in the market, new employment opportunities continue to grow in television, and sometimes film. There is also a growing labour market demand for arts graduates who are computer- and technology-savvy (NEA, 2011).

Wroclaw's art academies train individual artists that are primary sources of creative ideas and the key element at the very first stage in the value chain for most creative products. Despite their high-level skills, art graduates face challenges in the employability in the labour market, and tend to work as self-employed and/or combine creativity with teaching. Wroclaw's art academies have a limited labour market focus and do not generally provide targeted training for the emerging cultural and creative industries.

During the OECD review visit in February 2012, the Wroclaw arts academies demonstrated a limited labour market focus. The arts academies lack robust data on student performance, graduate employment or graduate destinations. The debate on changing needs and arising opportunities in the cultural and creative industries is in early stages in most institutions. Arts academies train students essentially for traditional careers within music or the arts on the assumption that graduates will work professionally within their own discipline. Additionally, preparation for work or entrepreneurship training or internships tends to be marginal in the curriculum, despite the fact that arts graduates will be, in effect, sole-traders or self-employed.

Examples of practices with greater labour market focus in Wroclaw's arts education include the partnership between the Department of Design of the Academy of Fine Arts and industry, which provides obligatory four weeks student placements. In addition, the University of Lower Silesia has developed study programmes with industry (see Box 4.6).

Box 4.6. University of Lower Silesia

Since 2003, ULS has offered a digital media study programme at the BA/MA levels. This multi- and inter-disciplinary programme has been designed for students interested in multimedia production design and critique. The programme connects subjects across new media studies, computer-media communications, visual arts, sociology of the Internet, cyber culture anthropology, web and graphic design. The programme has been developed with industry and courses are taught by professional lecturers. Of the 1 000 students studying journalism and media, 200 are undertaking studies in digital media on a full and part-time basis. A special international programme is offered in digital media and computer-mediated communications. Internships are offered by local institutions in media, multimedia, internet, music and mobile industries.

Source: University of Lower Silesia (*Dolnoslaska Szkola Wyzsza*) (2012), "Programs of Study," *Specjalnosc: media cyfrowe i komunikacja elektroniczna* (Specialty: Digital media and electronic communications), *www.digitalmedia.dsw.edu.pl/index.php?id=3090,* accessed 16 July 2012.

Considering the rapidly changing context of arts institutions in the midst of growing cultural and creative industries, further education and re-skilling opportunities in the arts and arts-related fields are in short supply in Wroclaw. Wroclaw's art academies could consider offering further education opportunities to their own graduates, as well as other individuals who are interested in broadening their career prospects. Examples of further education provision in the arts include the postgraduate Masters programme "Art in Context" that has been offered by the Berlin University of the Arts (UdK) since 2002 to people who seek to position their artistic work in the

context of society. This programme offers four specialisations: artistic work with social groups, artistic work with cultural institutions (including art museum studies), artistic work in public space and artistic work in the context of media and academia. The institute has 70 to 80 students, of which 60% are non-German, and almost three-fourths are female. The institute co-operates with different partners, such as museums, city institutions and private organisations.

Research, innovation and entrepreneurship

The cultural and creative industries are more innovative than many other high innovation sectors, such as professional and business services (Chapain *et al.*, 2010). Higher education and art education institutions can boost innovation and entrepreneurship in the cultural and creative industries by developing their research and innovation activities, and by supporting graduate enterprise.

International studies show (EUA, 2005) that the arts institutions need to meet increasingly demanding standards in doctoral studies, despite the fact that research in arts is an emerging field of inquiry.[4] While art academies in Wroclaw provide some opportunities for doctoral studies, they would benefit from developing an internationally competitive research culture or formal doctoral training in the arts and culture that would underpin academic studies and qualifications.

International examples from Australia, Finland, Ireland and the UK of graduate schools and doctoral programmes in the arts and creative fields could help inform further development of the cultural and creative industries in Wroclaw, and ensure that the academic capacity of the institutions meets the requirements of the Bologna reform and internationalisation (See Box 4.7).

Box 4.7. Research and innovation in the arts

Creative Industries Faculty, Queensland University of Technology (QUT), Australia

QUT has brought together its teaching and research across architecture, design, visual, performing and media arts, advertising and publishing, and creative software applications in partnership with the regional government and industry to establish the creative industries hub at its Kelvin Grove Campus. The emphasis is on collaboration, interdisciplinarity, entrepreneurship and excellence across teaching and research, and helping to grow the creative industries sector.

Box 4.7. Research and innovation in the arts (continued)

School of Arts, Design and Architecture, Aalto University, Finland

Topics of research relate to the fields of art, design, media, and architecture with sustainable development as an all-encompassing theme. The Media Factory is a platform for collaboration and development in media-related research and education involving teachers and students from all disciplines of the university. The aim is to develop multidisciplinary research and studies with various stakeholders from the media industry, the public sector, the third sector, etc.

GradCAM: the Graduate School of Creative Arts and Media, Ireland

Funded through as the result of a national competitive process, GradCAM is a collaborative programme of structured doctoral studies and research. It has developed a new paradigm for PhD training and research in the creative arts and media, combining critical intellectual enquiry and creative practice. The domain designation "creative arts and media" refers to a broad spectrum of creative practice including design practice, practice across the arts, creative media content and service development, and the technical, critical, theoretical and historical underpinnings of these disciplines/practices. There is a strong emphasis on interdisciplinarity and shared learning across the different art forms.

University of the Arts London, UK

Research degrees are based on creative practice, theoretical/historical analysis and experimental work, undertaken in any appropriate field and set within its theoretical, critical or design context. Where practical or creative work forms part of the submission for the award of MPhil or PhD, the submission includes evidence of research through practice and, where appropriate, the examination may also include an exhibition, or other presentation, of the student's work. A research degree is characterised by the sustained, rigorous and critical investigation of a defined subject, by the openness of the research methods and results to evaluation by others, and by the contribution to public knowledge and understanding of its outcome.

Sources: Graduate School of Creative Arts and Media (2012), GradCAM, *www.gradcam.ie,* accessed 16 July 2012; University of the Arts London (2012), Research Degrees at the University of the Arts London, *www.arts.ac.uk/research/degrees,* accessed 16 July 2012; Aalto University of Arts, Design and Architecture (2012b), Research, *http://arts.aalto.fi/en/research/*, accessed 15 July 2012; Queensland University of Technology (2012), Creative Industries, *www.qut.edu.au/creative-industries,* accessed 15 July 2012.

A core element of university support for innovation and enterprise in most countries is through new business incubation and graduate entrepreneurship. Based on the review visit, the Polish model seems to offer

limited mainstreaming of entrepreneurial experience in the curriculum of arts academies and other universities and little practical experience in new venture formation provided to students in the universities or art academies. Experience elsewhere shows that the most effective support for graduate entrepreneurship comes from teaching programmes where students work in teams to form real companies mentored by entrepreneurs. Such programmes can run at undergraduate and graduate levels and target students from across the sciences, engineering, business and arts disciplines. The OECD Review Team was able to find relatively little evidence of this type of activity.

4.3. Creative economy and social cohesion

This section reviews the efforts made by the local and regional authorities, as well as universities and art academies, to respond to the needs of the creative economy, including creative arts and media, and cultural tourism, as well as social cohesion. It highlights some of Wroclaw's city-driven projects to capitalise on the local potential in design, creative arts and multimedia and boost cultural tourism and urban regeneration. It advocates stronger efforts to engage universities and arts academies in the efforts to build the creative economy and social cohesion.

The creative arts and media

The city of Wroclaw has high ambitions to become the Silicon Valley of Eastern Europe with new labour market opportunities in the creative arts and media. The city is making efforts to tap into Wroclaw's underutilised potential for entrepreneurship and innovation in these fields. One of the examples of graduate enterprise in ICT and media is Nasza Klasa.PL, a Wroclaw-based social network portal that was launched as a student start-up in 2006. Four years later it had 14 million users. The emergence of Nasza Klasa-type social networks in Wroclaw is important because they bear witness to the creativity and enterprise among Wroclaw's young population. They also support the creative economy through their rapid expansion and by providing an opportunity for many creative enterprises to use social network services to offer their goods and services to wider audiences, often reaching global markets (see Annex 4.A.1).

Lower Silesia and Wroclaw are leading Poland's gaming industry, which is growing rapidly and providing new employment opportunities. The gaming industry could provide the basis for the emerging cultural and creative industries, but is struggling to find suitably qualified graduates (see Box 4.8). The city of Wroclaw has responded to the needs of the industry by supporting a small scale higher education partnership that involves students

from technology, design and business to boost transversal skills. These types of initiatives are commendable but they should be scaled up and integrated into the core curriculum of universities and arts academies to provide multidisciplinary, credit-bearing learning opportunities for all students.

Box 4.8. Wroclaw, Poland's capital of the gaming industry

Lower Silesia and Wroclaw are leading Poland's rapidly growing gaming industry, worth PLN 692 million in 2011, compared to PLN 368 million in 2009. Key Wroclaw-based firms in the gaming and multimedia for entertainment include: Techland, Tequila Mobile, Can't Stop Games, Xantus and 11bit Studios. They have achieved a string of successes in developing creative products. For example, Techland's Dead Island became the best-selling computer game, which sold 3 million copies and brought in USD 120 million revenues for 2011. Tequila Mobile maintains a platform that has 10 million users and 1.2 million transactions from 80 countries. Tequila Mobile's HD Fantasy Kingdom Defence game reached 1 million downloads in Google Play. Wroclaw's gaming industry is also gaining recognition in the international trade media, with high visibility and approval scores in the gaming rankings. Described as "the best trailer in years" by the Los Angeles Times trade blog, Dead Island's trailer won the Golden Lion for the best Internet movie in the Cannes Festival.

Wroclaw's gaming industry has translated into job creation. In 2010, the job offers for game programmers increased rapidly by 80%. The biggest gaming companies such as Techland have over 200 employees each. Can't Stop Games, with 40 staff members, recently announced a plan to double its staff in the short term, recruiting another 40 designers, computer programmers, analysts and writers. Industry reports reveal a growing demand for flexible and well-rounded graduates across technology, social networking and arts and humanities.

Source: Zeitchik, S. (2011), "Dead Island: The best trailer in years?" *Los Angeles Times*, 16 February.; Anonymous (2011), "Rynek gier komputerowych w Polsce wart 692 mln zl," *Dziennik Gazeta Prawna*, 2 December.; Grynkiewicz, T. (2012), "Mobilne gry z Wroclawia: 1,7 mln dol. od inwestorow" ((Mobile games from Wroclaw: USD 1.7 from investors), Wyborcza.biz, 6 January, *http://wyborcza.biz/biznes/1,101562,10921438,Mobilne_gry_z_Wroclawia__1_7_mln_dol_ _od_inwestorow.html*.; Glombicki, L. (2012), "Polacy najlepsi na swiecie – tworza gry, w ktore graja ludzie w Europie, Rosji, Chinach i USA," Na:temat, *http://natemat.pl/16013,polacy-najlepsi-na-swiecie-tworza-gry-w-ktore-graja-ludzie-w-europie-rosji-chinach-i-usa*.

In the absence of a strong entrepreneurial culture within the Wroclaw HEIs and art academies, the Wroclaw Agglomeration Development Agency (*Agencja Rozwoju Aglomeracji Wrocławskiej*, ARAW) and City Hall's economic development office have taken the lead and launched two major initiatives that aim to mobilise the cultural and creative industries.

The first is the Design Accelerator which, with the help of faculty from the Academy of Arts and Design, aims to increase market opportunities for graduates in design and creative arts, train creative employees, create innovative solutions to design-based issues, establish interdisciplinary experiences, and develop post-graduate studies in design and management. The second is the Wroclaw Multimedia Hub Creativro. Creativro is building a partnership between companies and HEIs (particularly the University of Lower Silesia) backed by business partners and sector leaders in order to unlock Wroclaw's potential for creative start-ups by linking design and multimedia through new academic programmes (Box 4.9).

Box 4.9. Design Accelerator and Creativro

The Design Accelerator offers a platform for designers and like-minded design enthusiasts to engage with each other. It supports entrepreneurs, HEIs, and the business and scientific sectors to create new competitive products. It offers modern tools and access to advanced software, ideas, contacts, the support of specialist teams (workshops by famous designers) and technologies for the commercialisation of products. The Design Accelerator project aims to increase market opportunities for graduates in design and creative arts, train creative employees, create innovative solutions to design-based issues, establish interdisciplinary experiences, and develop post-graduate studies in design and management. The Design Accelerator works through the Nadodrze urban regeneration project, which has the twin objectives of encouraging greater social integration and restoring old professional trades and crafts. Other initiatives include: "Design your profit" training sessions with the National Industrial Design Institute; the "furniture clinic" that restores and redesigns old, apparently useless objects; and eco-awareness events. The Design Accelerator collaborates with international partners such as the German Federal Foundation for the Environment.

Creativro aims to unlock Wroclaw's potential business development in computer games, interactive entertainment, digital animation and special effects; to attract and retain talent and venture capitalists; to build links with international strategic decision makers; and to showcase Wroclaw companies in the creative and design industries (Can't Stop Games, Techland, Tequila Mobile, XAntus Animation Studio). The University of Lower Silesia plays a crucial role in Creativro by creating academic programmes that meet the local and the national needs of the cultural and creative industries in multimedia and developing entrepreneurial skills. The university is developing a multi-disciplinary curriculum that combines technology, design and communication, and transmedia approaches.

Box 4.9. Design Accelerator and Creativro (continued)

The flexible curriculum will be aligned with EU and the National Qualifications system and will provide competencies in design and production of new platforms such as smartphones, tablets and interactive floors. Industry partners participate in the design and development teaching, as well as providing internships. Undergraduate and post-graduate studies can be pursued in digital media, computer mediated communication, 3D animation and FX and video games development.

Source: ARAW (Agencja Rozwoju Aglomeracji Wrocławskiej) (Wroclaw Agglomeration Development Agency) (2012), "Culture & Creative Industries (CCIs) driven by higher quality of life," PowerPoint presented at OECD Review Visit, Wroclaw, 23 February 2012.

While the Design Accelerator and the Creativro projects are both innovative initiatives, they would benefit from closer interaction and information exchange between industry and the HEIs. This could be facilitated by establishing interdisciplinary groups across the Wroclaw University of Technology, the Academy of Fine Arts, the University of Wroclaw and the University of Lower Silesia and between design and technology.

In view of the lack of collaborative traditions, Wroclaw and Lower Silesia could also consider creating a cultural and creative industries forum, through which representatives from the arts/creative industries, the city/region and industry/business can meet regularly to discuss issues and needs of common concern in order to capture the potential of the cultural and creative industries. This would also help create a common and wider understanding of the potential of the creative and cultural industries, and to identify mutual interests and benefits. The fact that the ARAW's Business Support Centre has put the arts and culture at the centre of Wroclaw's future and has been willing to fund this objective is an important statement and will strengthen the artsan important next step.

Articulating demand for innovation in Lower Silesia's SME sector is a challenge due to the limited cluster development and a lack of strong employer associations. Injecting innovation and creativity into more traditional SMEs that dominate most regional economies is a common challenge in many OECD countries. To create a demand pull for innovation and creativity, the city of Wroclaw or Lower Silesia could consider a business-to-business (B2B) voucher mechanism that encourages SMEs to work innovatively with creative companies. The early evaluation of the

impact of the UK Creative Credits pilot in the Manchester City Region suggests that the scheme can bring concrete benefits to the business community.

Box 4.10. Creative Credits in the UK: Manchester experience

Creative Credits is a business-to-business voucher mechanism designed to encourage small and medium-sized enterprises (SMEs) to innovate. Businesses receive credits worth GBP 4 000, which they must match with at least GBP 1 000, to purchase a variety of creative services from creative businesses. Creative Credits – like other innovation voucher schemes – addresses barriers to innovation in SMEs and boosts innovation in SMEs by directly linking them to creative businesses. Creative Credits is the UK's only dedicated business-to-business innovation voucher (other innovation voucher schemes have focused primarily on stimulating knowledge transfer from universities to businesses). It makes use of an online "Creative Gallery" to market potential creative service providers to the SMEs receiving credits and this way offers a substantially cheaper solution for business support schemes which often rely on costly administration and brokerage.

During one year (from September 2009 to September 2010) a total of 300 eligible creative businesses from Manchester City Region applied to service credits on the Gallery and over 670 SMEs applied to receive credits (one in eight of all the eligible population of firms). The majority of projects involved development of SMEs' websites, followed by marketing and video production activities, reflecting the comparative strengths of Manchester's digital media industries. For every ten credits awarded, eight were used to support B2B relationships involving creative servicers that would not have formed in the absence of the scheme. Almost 55% of creative businesses servicing credits claimed to have serviced an SME that was in a different sector from their usual clients, and over 41% described the SME as being outside their usual business networks. For every ten credits awarded, eight were used to create new B2B relationships involving creative services that would not have formed in the absence of the scheme, at least in the four to five-months stipulated project completion period. The Creative Credits projects proceeded largely as planned, with only 3% deviating from their original plan. 93% of projects achieved either all or some of their innovation objectives, with around 25% being associated with other unanticipated benefits.

The scheme is estimated to have generated short term additional sales of GBP 514 000 (an average of GBP 3 430 per credit). About 80% of businesses awarded credits claimed that the projects had increased their innovative strengths and over three-quarters said that it had stimulated other ideas for new innovation projects. Three-quarters of SMEs agreed that their business's attitude to innovation had become more positive through engaging with the scheme. Qualitative interviews pointed to some mechanisms through which these benefits occur (*e.g.* the transfer of skills and knowledge that relate to the process and content of creativity), but also indicate the obstacles (*e.g.* differences in how creative and "non-creative" businesses perceive the value of creativity). Many firms receiving credits indicated that they expected the benefits of their Creative Credits projects to increase, in some cases substantially, in the future.

Source: Bakhshi H., *et al*. (2011), "Creating Innovation in Small and Medium-sized Enterprises," NESTA Working Paper, NESTA, *www.nesta.org.uk/library/documents/Creating_Innovation_in_SMEs_v13.pdf.*

Cultural tourism

Worldwide growth in tourism continues, fuelling the growth of cultural and creative industries. Globally, tourism is a USD 3 billion a day business. In 2008, international tourist arrivals reached 922 million, with tourism receipts rising to USD 944 billion. In 2009, the level of tourism fell due to the world financial and economic crisis, but growth resumed in the last quarter of 2009. It is expected to continue over the longer term with 4% annual growth in international arrivals reaching 1.6 billion people by 2020. (UN, 2010)

Lower Silesia and Wroclaw want to profit from the rapidly developing tourism industry and mobilise cultural tourism to diversify the local economy and generate social benefits. Wroclaw's cultural sector, including the universities and art academies, contributes to tourism through the demand for visits to cultural heritage sites, festivals, museums and galleries as well as music, dance, theatre and opera performances. Wroclaw's multicultural traditions and emerging cultural ambience, in part nurtured by the higher education sector, has the potential to attract a growing number of cultural tourists.

The city of Wroclaw and Lower Silesia have made strong efforts to enhance tourism through innovative strategies, flagship events, new facilities for mobility, and cultural and sports venues. In 2006, the city administration adopted Wroclaw's Cultural Strategy with six programmes, including "Wroclaw – European Centre of Culture" and has since then implemented and upgraded this programme. The city authorities have ensured discount airline travel to expand tourism. The city has also built a football stadium and an event park and is currently building a National Music Forum and a Museum of Modern Art. The city of Wroclaw runs 27 cultural facilities and 250 cultural projects every year and is home to some of the best theatre in Poland. A string of strategic bids have been made to host Expos (Expo 2010 and Expo 2012) and the headquarters of the European Institute of Technology. Successful bids include the UEFA European Football Championship that took place in 2012, the World Music Days scheduled for 2014 and the Theatre Olympics that will take place in 2016 along with the European Capital of Culture.

Wroclaw and Lower Silesia have many assets that support cultural tourism, including multicultural heritage, heritage sites and university facilities that form the essence of the Wroclaw urban experience. Situated on a major trading route in central Europe, Wroclaw has been part of the Prussian and German Empires prior to WWI, the Weimar Republic, Hitler's "Third Reich" and the Soviet sphere of influence which all add layers to the city experience. Lower Silesia is home to three UNESCO World Heritage

Sites[5] and has the highest concentration of architectural monuments in Poland, accounting for one fourth of all historic sites in Poland.[6] Wroclaw's cultural assets in the built environment include university museums, galleries and university campuses. The university facilities span a large section of the Oder waterfront and the urban campus near Grunwaldzki Square. The University of Wroclaw's historic buildings, the Leopoldinum and the Oratorium Marianum, galleries, museums and the botanical gardens add to the cultural offerings of the city and attract cultural visitors from Poland and abroad.

The European Capital of Culture 2016 poses a challenge to the preservation of cultural and environmental resources in Wroclaw. Effective policies and actions should be put in place to maximise the positive impacts of tourism and its linkages with the emerging creative economy and higher education institutions. Tourists are important consumers of recreational and cultural services and creative products such as crafts and music. Joint efforts including art academies and universities are essential for building linkages to ensure that Wroclaw's emerging cultural and creative industries are able to capture a greater share of tourists' expenditures in Wroclaw and Lower Silesia and that the local population will be able to participate and co-produce the diverse cultural offering. The city, in collaboration with the art academies and universities, could also help develop a stronger base of creative businesses that are able to supply a sufficient quantity of quality goods and services to respond to the demand from the cultural tourism sector. Finally, strategies for skills development in tourism are required.

The City of Wroclaw and the wider region needs to develop a long-term growth strategy for the tourism industry that responds to the needs of the Capital of Culture and long-term megatrends in tourism (see Box 4.11). Such a strategy should be designed in partnership with other levels of governments, educational organisations, public and private sector employers, trade unions, and should guide a comprehensive approach to skills development. The outcome should be the alignment of industry needs with detailed competency development in higher education. Bridging the gap between education provision and industry needs requires revision of curricula, including entrepreneurship skills, up-skilling of educators, work-based and experiential learning opportunities, linkages and pathways between vocational training and higher education, and the provision of new delivery models with greater flexibility, especially for lifelong learning and up-skilling of workers. (See also OECD, 2012.)

Box 4.11. Megatrends impacting the skills needs in tourism

Several megatrends impact the need for skills in tourism-related jobs. Oxford Research, as part of its comprehensive review of the European HoReCa (hotel, restaurant, catering) sector, identified a number of drivers that are influencing and changing tourism:

- **Ageing population**: This impacts both the demand – tourists requiring more specialised services – and the workforce. While older tourists tend to have the time and financial resources to engage in higher quality experiences that have a definite learning component, they are challenged by disabilities that require accommodation in terms of accessible facilities and the provision of specialised services. Greater attention will need to be placed on individualised needs. This customisation of services and experiences requires flexibility and responsiveness on the part of employees. The tourism industry is characterised by a young workforce. However, with an ageing population, there will be greater competition for these young workers from other sectors as well. This will force the tourism industry to attract older workers, who are often less flexible and have more physical limitations than younger workforce.

- **Changing lifestyles and consumer demands**: The sophistication of tourists places increasing demands on the quality and professionalism of services delivered. Tourists demand more information about what they buy, and more tailored services. Experienced tourists are aware of global concerns (social and environmental conditions) and personal concerns (healthy lifestyles, nutrition and local/organic food production). This places greater demands on the organisations, how they address corporate social responsibility and incorporate sustainability in the general management of all aspects of the business. This requires knowledge about topics as diverse as traceability and fair trade, especially of food and beverage, health, climate and the environment. The increasing number of threats to the safety and security of guests also means greater skills and awareness on the part of the workforce.

Box 4.11. Megatrends impacting the skills needs in tourism (continued)

- **Increased use of information technology and communication (ICT) and the Internet**: The Internet offers customers greater ability to research and businesses greater marketability, both of which are profoundly changing the industry. The overall Internet penetration rate for OECD member countries is estimated at 65.4% (Miniwatts Marketing Group, 2010). Much of trip planning is now completed online, although booking over the Internet varies widely among countries. Technology not only allows potential travellers to find out about the destination, its products and services, and the experience of other travellers, but also gives small and niche products an opportunity to reach out to a world-wide clientele. This requires the capacity to handle ICT within the organisation, a strategic understanding of the use of ICT by senior management and much greater skills in developing and using new online tools such as social media by all levels of staff. The way business is conducted within establishments has also changed. For hotels, this means tracking guest preferences over time and indeed, throughout chain properties. For the foodservice industry it means that a great variety of finished and semi-finished products are available, and preparation techniques have also seen significant changes.

- **Globalisation and economic growth**: Disposable income and spending on travel and dining are directly correlated, as is the demand for quality, specialisation and uniqueness. While globalisation allows for greater market reach, it also increases international competition. The creation of international workplaces demands skills in diversity management. It is also changing the way business is conducted with more outsourcing, international franchising and contract management, demanding improved control and quality systems, international branding and international administration and accounting.

Source: OECD (2012), *OECD Tourism Trends and Policies 2012*, OECD Publishing. doi: 10.1787/tour-2012-en.; Miniwatts Marketing Group (2010), "Internet world stats: Usage and population statistics", Internet World Stats: Usage and Population Statistics, *www.internetworldstats.com/stats16.htm*.

Social cohesion and environmental sustainability

Wroclaw and the wider region have, in recent years, undergone rapid economic changes that have contributed to social and economic exclusion, environmental degradation, and growing disparities within the city and the wider region, as well as between social groups. In the EU context, Poland and Wroclaw remain poor: of the 23.5 million Europeans whose daily income is less than the equivalent of EUR 10, nearly 10.5 million are Polish nationals. The deprived inner city areas of Wroclaw, such as the Nadodrze district, and rural areas of Lower Silesia are affected by long-term unemployment and face mounting problems of social exclusion. The breakdown of traditional patterns of work has affected social and community life. A large part of the local population – the young, the unemployed, families with many children, seniors and people with disabilities – do not take advantage of Wroclaw's cultural offer, contributing to self-exclusion (Wroclaw 2016, 2011). Rapid growth has increased air quality problems, with over 100 000 people commuting in the Wroclaw metropolitan area, many in private vehicles. Wroclaw also faces particular air quality problems because of the strategies of some low-income residents to save money by burning wood and other combustibles to provide heat.

Box 4.12. Urban regeneration in Wroclaw and inner-city decay in the Nadodrze District

Supported by EU Structural Funds, Wroclaw's Local Regeneration Programme has focused on a priority area of 1 500 ha in the city centre that corresponds to 5% of Wroclaw's total area, but is home to almost one-fourth of the population. The most serious challenges are the massive dilapidation of historic buildings, traffic jams and the lack of integration into the trans-European traffic network, continual neglect of residential and public areas, and the former industrial and military sites that need to be transformed and redeveloped.

Part of Wroclaw's urban regeneration efforts focus on Nadodrze District (former Odra suburb), a 20-ha architectural pearl, located on the right bank of the Odra river, next to Wroclaw's Old Town. Nadodrze has a population of 9 279 that lives in dense quarters of 19th century tenement housing that is under conservatory protection and belongs to the city of Wroclaw. Nadodrze District has a high population density and is in need of revitalisation. The historical Odra suburb, built in the years 1870-1900, was based on a unique architectural layout of geometrical streets and squares and developed into a commercial centre.

Box 4.12. Urban regeneration in Wroclaw and inner-city decay in the Nadodrze District (continued)

Having avoided heavy damages in the World War II that devastated most of Breslau/Wroclaw, Nadodrze was left to decay with limited renovation. The 1997 flood accelerated the deterioration process and damaged the physical condition of the buildings. Today Nadodrze is characterised by physical decay of historic buildings, degradation of public space and devastation of urban infrastructure. The physical decay is combined with mounting problems of poverty, low skills, social exclusion, long-term unemployment, high crime rates and social pathologies.

The main goal of Wroclaw's comprehensive regeneration is the prevention of marginalisation of the inner-city areas and transforming them into attractive tourist and economic centres. Higher education institutions' contributions to these efforts have so far been driven by few enterprising academics without major institutional thrust. The Capital of Culture 2016 and the new EU programming period provides an opportunity to mobilise the joint efforts of higher education institutions for urban regeneration, which requires interdisciplinary collaboration, and combining research and learning with outreach activities.

Source: City of Wroclaw (2009), "Wroclaw: The Meeting Place. Social and Economic Regeneration of the former commercial routes Nadodrze District," PowerPoint from URBAMECO Meeting, Wroclaw, April, *http://urbact.eu/fileadmin/Projects/URBAMECO/outputs_media/LAPWroclaw_en-2.pdf*.

The city of Wroclaw has recognised that the policies and interventions for the creative economy have to respond not only to economic needs, but also to the demands from local communities related to social cohesion, inclusion and environmental sustainability. The city and its regional stakeholders see creative activity as a tool to facilitate social cohesion, urban regeneration and regional development schemes, making Wroclaw and Lower Silesia more attractive to work and live in (see also Leadbeater and Oakley, 1999). As evidence of the city authorities' long-term commitment to creativity, music and arts education has been reintroduced into schools in Wroclaw. Along with an increasing number of cities, Wroclaw is ready to capitalise on the notion of creative cities to formulate urban development strategies for reinvigorating growth in excluded communities. The aim is to adapt this approach for rural areas and disadvantaged communities in Lower Silesia as a tool to generate jobs, empower people and promote social inclusion.

In order to improve social cohesion, Wroclaw and Lower Silesia have identified culture as a means of overcoming social inequality, which has led to the disenfranchisement of many residents. Wroclaw's application for the title of the European Capital of Culture 2016 sets out high ambitions to transform culture from "a mere supplement to material aspects of the lives of individuals and social groups" to a key component of "the life of every human being" and "a right of every individual". Wroclaw wants to "build open spaces to promote people's exposure to works of authentic art and to enable them to derive pleasure from them" (Wroclaw 2016, 2011).

Wroclaw's arts academies and universities have the potential to make an important contribution to cultural and social development. Wroclaw's art academies provide an active performance and exhibitions schedule for the city, which includes children's choirs and workshops, and the "University for Children," which introduces music and instruments, presents music performances and animation/film shows and offers preparatory educational programmes for school students intending to pursue the arts or music. Exhibitions and performances are held in prisons and hospitals as part of outreach activities. The University of Wroclaw's social sciences and arts and humanities provide a base to engage with the community through research, education and community development. The university's historic buildings, the Leopoldinum and the Oratorium Marianum, galleries and museums of natural history, mineralogy, anthropology and zoology, together with a new herbarium and botanical gardens, provide a stage for the annual festival of science that brings together the world of science and the general public. The Wroclaw University of Technology (WUT) adds to the creative offers through its theatre, orchestra, Big Band, three choirs, cabarets, music clubs and bands. WUT also provides skills for creative enterprises, such as in the field of ICT. WUT students reach out to the urban and rural poor by contributing to the revitalisation efforts, building temporary houses for the homeless, volunteering in collection programmes and visiting orphanages and hospitals. The University of Lower Silesia has an active approach to society and has, for example, developed inner-city green areas in collaboration with the city of Wroclaw. The Prazce Campus is home to science communication facilities and aims to showcase environmental sustainability efforts.

Despite many activities, the engagement and outreach activities of the Wroclaw universities and art academies remain predominantly one-dimensional and supply-driven. They are often based on what the universities and academies want to perform, exhibit or undertake, confined to traditional audiences, rather than something done in partnership with the community or the city. Arts and culture is perceived as a matter of enlightenment or entertainment, which marginalises the arts and its social

and economic impact and potential. Beyond the exhibitions, performances and events, interaction between the universities, art academies and wider society remains limited. Wroclaw's students participate in NGO work, which has recently been brought under the co-ordination of the city-initiated Centre for Social Development and Information (*Centrum Informacji i Rozwoju Społecznego*, CIRS), but the volunteering is neither monitored nor recognised as part of the curriculum.

International experience

Wroclaw could take advantage of applicability of the arts and culture in helping to resolve wider societal problems, such as encouraging greater social cohesion, educating the general population about the value of the arts, broadening appreciation and consciousness of different art forms or engaging the general public in artistic activity. A useful example comes from the Dublin Institute of Technology, whose music programme has developed a multi-pronged strategy to engage with the community, ranging from widening access and youth empowerment to active performance programmes for the wider audience throughout the Ireland.

Box 4.13. Ballymun music programme, Ireland

The Conservatory of Music and Drama, Dublin Institute of Technology, works with primary and secondary schools in a Dublin community that has had almost no access to music education to provide an introduction to music. Free music lessons are provided for a variety of instruments taught by advanced music students of the Conservatory; lessons are also provided in string, brass, wind and blues ensembles. The programme provides a structure that facilitates the ongoing development of the young musician from the beginning stage through secondary and into higher education. Scholarships are provided for highly motivated students to participate in all aspects of the Conservatory's activities; this includes individual tuition, theory classes, band and orchestra. The Ballymun student orchestra has played in the National Concert Hall, and at various other venues around the country. A film was made illustrating the success of the initiative: Ballymun Lullaby.

Source : Dublin Institute of Technology (2012), "Ballymun Music Programme," Community Links Programme, *www.communitylinks.ie/ballymun-music-programme*, accessed 16 July 2012.; Dublin Institute of Technology (2012), "Ballymun Lullaby nominated for prestigious IFTA," News & Events, 18 January 2012, *www.dit.ie/news/archive2012/ballymunlullabynominatedforprestigiousifta.*

While cultural and creative industries can empower individuals and communities, and contribute to social inclusion, the digital technologies are

making the creative industries more accessible and attractive to young people. The impact is increasingly felt within the classroom in Wroclaw and elsewhere where students are seeking opportunities to learn digital technology skills and to express themselves creatively. Wroclaw's universities and art academies could support cultural and creative industries and revitalisation efforts by developing a broad creative curriculum and programming for all schools and centres outside of the formal education sector. This task would be particularly suitable for the University of Wroclaw, which is the main university in Wroclaw that educates future teachers. For example, in Ireland, government initiatives have acknowledged the role that the cultural and creative centres outside the formal education sector can have in developing a new workforce. The Irish government has made significant investment in film centres in Dublin, Cork, Galway and Limerick to develop their capacity in the creative use of digital technology and as training centres providing services to both the informal and formal education sectors.

The experiences in Northern Ireland could inform Wroclaw and Lower Silesia to develop a stronger relationship between regional development and social inclusion by building creative learning centres. The Nerve Centre in Derry has almost two decades of experience in the design and delivery of digital community relations resources for use in formal and non-formal learning. The focus on the creative process has enabled the Nerve Centre to pursue a strategy that combines cultural and educational objectives with social and economic goals (see Box 4.14).

Box 4.14. The Nerve Centre in Northern Ireland

The Nerve Centre was established in 1990 as a focal point for youth culture in Derry, Northern Ireland's second city, and soon grew into one of the most dynamic and innovative multimedia centres in the British Isles. By bringing popular music, film, video, animation and interactive multimedia together under one roof, the Nerve Centre promotes creative collaboration and fusion between artists and provides a cultural outlet for young people who feel excluded from what is traditionally regarded as the "arts sector". The Nerve Centre is a production house, or a cultural factory, for the creation of new music, film, video, animation and digital media. It is also the North West's premier live music venue hosting performances by major acts while providing opportunities for new bands and artists from Northern Ireland. The Nerve Centre's development strategy spans a broad spectrum of activity within the creative industries: organising the Foyle Film Festival and developing the Orchard Cinema; nurturing and promoting new musical talent through in-house rehearsal and recording facilities; supporting the digital media sector; and generating new films, animation and multimedia through the in-house production company.

Box 4.14. The Nerve Centre in Northern Ireland (continued)

The Nerve Centre has almost two decades of experience in the design and delivery of digital community relations resources for use in formal and non-formal learning. Its resources repackage elements of Irish and British history and use interactive technologies to engage learners with insights and knowledge about identity and difference in Northern Ireland today. Workshops and extended programmes of learning are tailored to the individual needs of a group and seek to unleash the creativity of the learner in directing them to explore these key issues by creating their own digital responses to the learning. Accreditation is also available for learners aged 15 and over through a web-based learning resource: *www.diversityonline.org*.

The Nerve Centre is a learning environment that promotes the creation of ideas, images and innovation by providing hands-on experience of the creative industries. Young children can take their first steps in artistic expression with talented professionals. The Nerve Centre has developed the Creative Learning Centre, an educational model that brings digital creativity into the school curriculum. By providing teachers and pupils with access to 21st century digital literacy, high level ICT skills, the Nerve Centre aims to empower young people to become active, creative learners. Young people learn to write a song or compose a soundtrack; take a digital photograph or shoot a video; design a logo or build a web page; edit together a video sequence or animate a story. Together with Northern Ireland's other two Creative Learning Centres in Belfast and in Armagh, Nerve Centre is offering a tailored programme of professional development courses that will help schools to explore the potential for using ICT creatively in their own classrooms and across the curriculum.

The Nerve Centre's approach to developing the new skills required to keep pace with technological change is based on producing high quality content. The Nerve Centre provides digital media workshops in digital music, digital photography, graphics, web design, comic making and video production. It also trains youth leaders to use digital media. In music it has promoted indigenous talent to national and international success; in animation and multimedia it has looked to local history and popular mythology to inspire animation series for schools; and in film it has produced the Oscar-nominated Dance Lexie Dance, the most successful live action short film ever made in Northern Ireland. Every year the Nerve Centre runs a week-long programme for young musicians aged 14 to 17 where they can engage with other young musicians and sample voice coaching, guitar techniques, percussion master classes and talks by managers, promoters and other music industry experts. The programme consists of master classes for contemporary musical instrument and style, with a varied selection of workshops facilitated by music industry professionals. The basis or hub of the programme revolves around band formation, song-writing, stagecraft and working towards a final showcase performance in the Nerve Centre venue.

Box 4.14. The Nerve Centre in Northern Ireland (continued)

The Nerve Centre currently has over 100 000 people benefiting from the work of the centre across events, programmes and projects. 40 000 people attend music concerts at the centre, a further 15 000 attend film events, 10 000 are engaged in a proactive educational programmes that includes a cultural diversity programme, 120 music lessons a week, 600 practices per year and over 150 take part in Nerve Centre training courses.

Source: The Nerve Centre (2012), The Nerve Centre, *www.nervecentre.org,* accessed 15 July 2012; Northern Ireland Department of Culture, Arts and Leisure (2000), *Unlocking Creativity: A Strategy for Development*, Department of Culture, Arts and Leisure, Belfast, *www.dcalni.gov.uk/index/arts_and_creativity/unlocking_creativity_-_a_strategy_for_developement.pdf*.

Wroclaw could also consider making efforts to transform emerging local community centres into creative community hubs in order to pool and mobilise the emerging academic expertise in community development that is spread across different departments and institutions. To pursue an economic development strategy that is both creativity-based and socially inclusive, Wroclaw and Lower Silesia could launch pilot projects in a few communities, such as Nadodrze and the suburbs to leverage local resources. While the process has been started by the Design Accelerator's Nadodrze urban regeneration project, which aimed to improve social integration and restore old professional trades and crafts, the creative community hubs would go further in combining cultural and creative development programmes with the economic revitalisation of at-risk neighbourhoods. The creative community hub approach would capitalise on the existing organisations and knowledge of community issues and conditions, allowing programmes to be developed and adapted to individual neighbourhoods' specific needs and creative talent. Two well-known examples are the Point Community Development Corporation in New York City and Creative London's Hub Strategy, which use this approach to address the needs of economically and socially disadvantaged communities. While the scale and conditions may differ, these approaches provide useful examples for Wroclaw's community action: they link creative community programming to local economic development through the principle of co-production, where the local community is engaged in the development and implementation of the projects and not only a recipient of the targeted action.

Box 4.15. Community engagement and revitalisation: New York and London

The Point Community Development Corporation in New York City is an effective example of creative community programming linked to local economic development. The Point uses the creative heritage of the South Bronx (a neighbourhood better known for poverty, crime, poor schools and inadequate housing) to catalyse community development by encouraging youth to cultivate their artistic and entrepreneurial capabilities. The Point recognises the talent and aspirations of local residents as the area's greatest assets and offers programmes to develop that talent in music, dance, photography, theatre, fashion and other disciplines. Enterprise and community development activities are connected to the artistic programmes while, at the same time, small businesses and non-profit organisations are incubated. In the process, the Point promotes projects that address local concerns such as transportation, pollution, open space and environmental stewardship.

Another example of creative community programming linked to local economic development is based on Creative London's Hub Strategy. Creative hubs work in areas of London with high concentrations of creative businesses. In each neighbourhood, a lead organisation is designated as a focal point through which further assistance to cultural industries and creative activities is channelled to continue addressing local needs. Hubs differ in their structure depending on local circumstances, but can act as incubators for creative businesses, clearinghouses of information on locally available property, developers of long-term plans for the local creative sector and promoters of local creative work.

Source: Evans, G., J. Foord, M. Gertler, L. Tesolin, S. Weinstock (2006), *Strategies for Creative Spaces: Lessons Learned*, London Development Agency, London, *www.citiesinstitute.org/londonmet/library/a12324_3.pdf*.; The Point Community Development Corporation (2012), The Point, *http://thepoint.org.*

4.4. HE physical assets in local creative economy

This section outlines the role of universities and art academies as key "place-makers" and physical assets for Wroclaw's creative knowledge economy. It identifies the design, proliferation and duplication of higher education facilities as key issues for Wroclaw's creative economy. It recommends that Wroclaw should extend its regeneration strategy to universities and art academies by developing a "cultural quarter". It advocates for greater collaboration in space management and a collaborative long-term strategy for Wroclaw's physical environment that is relevant to creativity, learning, research, business and society.

Space utilisation for knowledge exchange and creativity

The design and location of higher education buildings are important for the development of the university as a knowledge centre and the university-city relationship. Higher education buildings can be shared with the community and the business sector, for joint research projects or training. In the same way, other buildings in a city, whether commercial or public premises, can be used for teaching, research or administrative functions of HEIs. The location of HEIs and their proximity to the business and community create urban environments in which individuals and groups from different backgrounds and disciplines can mix.

Ownership of facilities is an important part of university autonomy. Poland's Higher Education Law of 2005 granted universities the ownership of their buildings, but in practice universities are not able to autonomously decide on the sale of these assets.

Wroclaw has a fragmented set of learning environments with limited physical relationships to each other, partly duplicating functions. Buildings used by the different institutions house isolated communities of academics scattered across the city. Using separate small buildings is inherently less efficient than using a single larger building to house the same functions. This fragmentation has a negative impact on the efficiency of buildings, knowledge exchange and creativity. To ensure that spatial environments support creativity and encourage people to share knowledge and exchange ideas, buildings should by their design encourage people from different disciplines to meet, even accidentally (Thufvesson, 2011). In Wroclaw, knowledge exchange and sharing are highlighted in the Pracze Campus outside of the city centre and distant from the higher education institutions.

Currently Wroclaw's university facilities do not fully support efficient space utilisation and face diverse challenges. For example, many of the University of Wroclaw's departments or faculties are housed in heritage buildings which are expensive to maintain, need continuous maintenance and lack flexibility because of legal restrictions on structural alterations.

Wroclaw's physical environment and service structure is also shaped by student housing and canteens, both declining and partly replaced by commercial services. The landmark of the urban campus district in the Grundwaldzki Square area, Wroclaw's dormitories were built in the 1960s and 1970s, and increasingly privatised in 2000s. The number of dormitories declined from 43 in 2000/2001 to 34 in 2012 with 10 609 beds. The proportion of students residing in dormitories dropped from 19.9% to 6.9% in 2009. The university-owned student canteens are also being phased out, from eight canteens with 1 700 seats in 2000 to four with 670 seats in 2009. Visible student presence and demand is an economically important element

of Wroclaw's urban landscape, determining the shape of services and commercial offer (Wroclaw's Regional Steering Committee, 2011).

The Wroclaw universities have important physical assets that make a contribution to civil society, but there appears to be no shared vision between the universities and the city for the future strategic management of these assets in the broader urban context. The linkage between the spatial development of the city and its economic, cultural, social and environmental development needs to be better articulated. This could be achieved by developing a shared vision for the future of the city and region with the universities and within which future joint projects can be pursued.

One way to move forward is to extend Wroclaw's physical regeneration strategy to universities. The city of Wroclaw has embarked on a long-term regeneration strategy to exploit its assets of historical buildings under the motto "Wroclaw - The Meeting Place" through which the city seeks to draw attention to its historic role as the place of interchange for goods and ideas. Wroclaw's physical planning department has the responsibility for the urban regeneration strategy, but the universities that have buildings or zones in the regeneration area do not seem to be part of these plans. In Wroclaw, local plans could focus on developing a "cultural quarter" which could engage not only the university estates departments but also the arts and humanities departments of the universities, as well as art academies, in the same way as WTC and the Pracze Science Park link with science and engineering.

Facilities management and space utilisation for sustainable future

From a facilities perspective, universities and art academies and the city of Wroclaw face a number of challenges in developing buildings to meet the needs of 21st century higher education and the broader needs of creative and learning communities:

- How to develop facilities that provide enough space now and are flexible and adaptable for different future uses, whether by the higher education institution or a different user, given the prospective decline in student numbers.
- How to make connections between the buildings and other facilities within the city to facilitate creativity and enable knowledge exchange between different higher education institutions, departments within one institution and between universities and the industry and the community.
- How to intensify the use of individual buildings to increase their efficiency.

- How to reduce the floor area of the facilities and provide an environment that meets different needs of the higher education institutions and others in the community who may use them.

While these challenges can be met in different ways, for example by sharing facilities, or relying on facilities outside the university campuses to meet some of the demand (see den Heijer, 2012), these strategies have not been fully explored in Wroclaw HEIs.

On the contrary, the response in Wroclaw seems to have been a construction boom and proliferation of buildings. Access to the EU funding and the huge backlog of modernisation work has contributed to a building boom in higher education: universities and art academies are constructing new buildings for similar functions (for example libraries) in close proximity to each other. Constructing the same facility several times over ignores the benefits of scale that may be achieved by institutions sharing facilities.

Wroclaw should develop its capacity to use its physical infrastructure within the city, whether it is higher education buildings, commercial or public buildings to capitalise on knowledge-intensive innovation to create smart learning communities (see Hassell Ltd., 2009). As a city that aspires to become a creative knowledge metropolis, Wroclaw will need a range of facilities that support collaboration, encourage knowledge exchange, attract talent and contribute to social cohesion in the community.

Currently, there appears to be limited understanding of the range of challenges associated with the Wroclaw higher education buildings and facilities. This is a concern since facilities represent 20% of the university operating costs and are subject to new and demanding supra-national requirements for energy efficiency (See Box 4.16).

Box 4.16. Cost and space efficiency and greening of university facilities

Buildings and facilities are an important cost item for universities and require management to improve the cost and space efficiency. Facilities represent about 20% of a university's operating costs (TEFMA, 2009). To be effective and sustainable, the facilities must be capable of supporting the university's current and future teaching, learning and research needs, as well as the needs of the wider community with which the university engages. The facilities must also be managed efficiently so that the use of the resource is maximised and the cost of operation and maintenance is kept within manageable limits. The cost of running facilities is attributable to many factors, such as the maintenance and operation of the buildings. While cost is important, so is the value that paying that cost provides. For example, an expensive new building is worth the price if it attracts cutting-edge research and new students and facilitates improved knowledge transfer and innovation. Given that space utilisation in university buildings can be very low (about 25%) and difficult to increase (Neary *et al.*, 2010), universities face the challenge of making the best use of their space so that they can maximise its value.

Supra-national and national governments increasingly require universities to develop energy-efficient facilities. Universities and business face the challenge to reduce increasing energy demand in buildings generated by more intensive use of technologies, higher standards demanded by occupants whether for heating or cooling, badly insulated building fabric and often poor management of energy consumption. Increasing building energy performance standards required by legislation driven in Europe by the Energy Performance in Buildings Directive and the proposed Energy Efficiency directive, which has proposed an annual renovation rate of 3% for all public buildings owned or occupied by public bodies, are forcing owners and users to address how to reduce the energy they use, whether it is by reducing the amount of floor area they occupy or by renovating the fabric. Public concern about the environmental consequences of energy consumption in buildings, estimated to be 40% of primary energy demand across OECD countries, is likely to see continued pressure for both the public and private sectors to find ways of creating more energy efficient environments. Countries are developing innovative solutions for tackling carbon reduction, such as the carbon reduction target and strategy for higher education in England (Oakleigh Consulting Limited, 2010) or the International Campus of Excellence programme in Spain, which includes energy performance as one of its criteria (OECD, 2010b).

Source : Oakleigh Consulting Limited (2010), "Literature Review for the Higher Education Collaborations, Alliances and Mergers Project," HEFCE, *www.hefce.ac.uk/media/hefce/content/pubs/2010/rd1910/rd19_10.pdf.*; Neary, M., A. Harrison, G. Crellin, N. Parekh, G. Saunders, F. Duggan, S. Williams and S. Austin (2010), *Learning Landscapes in Higher Education*, University of Lincoln, Lincoln, UK, *http://learninglandscapes.blogs.lincoln.ac.uk/files/2010/04/FinalReport.pdf.*; Blyth, A. and J. Worthington (2010), *Managing the Brief for Better Design*, 2nd edition, Routledge, London.; TEFMA (Tertiary Education Facilities Management Association) (2009), *Space Planning Guidelines: Tertiary Education Facilities Management,* 3rd edition, TEFMA Inc., *www.tefma.com/uploads/content/26-TEFMA-SPACE-PLANNING-GUIDELINES-FINAL-ED3-28-AUGUST-09.pdf.;* OECD (2010b), *Higher Education in Regional and City Development: Andalusia, Spain 2010,* OECD Publishing. doi: 10.1787/9789264088993-en

The city of Wroclaw could consider creating a long-term strategic plan for Wroclaw that is relevant to creativity, learning, research, business and society and seek to bring together the academic world, commerce and industry, and the general public. From this, it should redefine how the physical environment across the city will support these diverse needs. Such an approach requires that: *i)* a shared vision is developed through a participatory but guided planning process; *ii)* complementary facilities are provided and these facilities can be opened up to target groups, such as industry, the general public and academics; and *iii)* an integrated sustainability concept is implemented (Schmitt, 2010).

Conclusions and recommendations

The city of Wroclaw and Lower Silesia have a growing awareness of the assets and opportunities in the cultural and creative industries. They emphasise the role of culture in the revitalisation of the economy, encouraging tourism and enhancing business capacity. They also see culture and creativity as a vehicle to improve social cohesion. As evidence of Wroclaw's long commitment to creative economy and social cohesion, music and arts education has been reintroduced into the school curricula in order to ensure access to creativity for all youth and to prepare future artists and provide employment opportunities for graduates in the art fields. In collaboration with its regional partners, the city of Wroclaw has also launched a range of initiatives, projects and programmes that capitalise on the emerging assets in the field of cultural and creative industries and address the challenges in social cohesion.

The status of European Capital of Culture 2016 provides an opportunity to mobilise the universities more effectively for the creative economy and social cohesion of Wroclaw and Lower Silesia. The Capital of Culture has highlighted some of the challenges of Wroclaw and Lower Silesia in the cultural and social domains which the universities and art academies individually and collectively could address. These challenges include: a low level of co-operation between the academic community and the city and the region; insufficient international recognition of the city and its higher education sector; low levels of participation in cultural life; and social and economic exclusion of some individuals and social groups and withdrawal from civil and social involvement.

The European Capital of Culture can facilitate the development of the creative economy and social cohesion in Wroclaw, but university resources need to be mobilised in order for it to succeed. Despite the commitment of

the Wroclaw Agglomeration Development Agency (ARAW) to collaborate with the universities, Wroclaw's universities and art academies are relatively weakly connected to the European Capital of Culture initiative and collaborations remain driven by entrepreneurial individuals on an *ad hoc* basis. While there is expertise in the Academy of Music and Academy of Fine Arts, the Faculty of Historical and Human Sciences at the University of Wroclaw and at the University of Silesia that is highly relevant to Wroclaw's growth as a creative and educational city, this expertise is not as interconnected as in the area of business innovation. In the field of arts and culture, and in community engagement, there is a need to pool expertise from a variety of disciplines from the universities and arts academies in order to work with the public authorities. Yet there is no obvious focal point for this collaboration. One way to move forward could be to design an institutional framework to mobilise the intellectual resources of the universities around the themes of creative economy that form a link between global and local citizenship.

The universities and the public authorities in Wroclaw have begun to build collective capacity in public health to address the challenges facing the city. Examples include, a Public Health Institute at Wroclaw Medical University (*Uniwersytet Medyczny im. Piastów Slaskich we Wroclawiu*) and a joint initiative of the municipal health department and the University of Environmental and Life Sciences (*Uniwersytet Przyrodniczy we Wroclawiu*), focusing on the promotion of healthy lifestyles and prevention of health hazards.

The traditional approach of the Wroclaw universities and art academies poses a challenge for developing Wroclaw's creative economy and social cohesion. The focus, organisation, curriculum, pedagogical practices and ways of working within the institutions and with regional stakeholders remain traditional. Their engagement and outreach activities are confined to traditional partners and audiences and remain supply-led rather than something undertaken in partnership with other institutions, the community or the city. For example, the Wroclaw art academies are primarily teaching-only institutions that lack focus on research and engagement that reinforce and underpin learning. The focus is primarily on graduates working within their art form. Employer and stakeholder links remain weak. There is little consideration that wider societal issues or graduate employability are responsibilities of the arts education sector.

Universities, art academies, the city of Wroclaw the regional government and the industry sector could join efforts to develop mechanisms to nurture the cultural and creative talent among the regional population, to attract creative talent from outside of the region and to turn new ideas into cultural and social enterprise. Stronger links with students,

researchers and artists from Europe and elsewhere could bring benefits to the regional economy. In general, there is a need for a wider innovation concept: innovation activities should focus on Wroclaw's attractiveness in terms of quality of life, in addition to science and technology. More focus on the management of universities' physical assets is required to avoid proliferation and duplication of higher education facilities.

For Wroclaw's art academies, many strategic questions remain to be addressed: How do the Wroclaw art academics see themselves in the future higher education landscape? Where does arts-based education fit within the overall framework and vision for Polish higher education articulated by either the city or the ministry? Should the institutions remain as separate and independent academies or should they form stronger alliances either with each other or with the other universities? What are the opportunities for greater cross-sectoral and cross-institutional linkages? And specifically, if the creative industries (as distinct from the cultural industries) are considered ripe for growth, what links are possible between arts-based education/research and technological education, or between arts-based education/research and the natural sciences?

Wroclaw universities and art academies cannot succeed if they remain isolated from their cultural settings, but need to become increasingly central to the sustained economic, social and cultural life of the city (see Corneil and Parsons, 2010). Wroclaw's universities and arts academies have a responsibility to expand their activities beyond the institutional walls. In doing so, the institutions can actively help to expand their audience and customer base, audiences for music, theatre and opera, purchasers of artefacts, philanthropy for arts productions and the institutions. This involves going beyond the city centre, and engaging more directly with the community – using the arts as a tool for widening participation. They need to become engaged universities that not only create environments for teaching and research, but also draw in the community.

To advance the agenda for creative economy and social cohesion, the OECD review team makes the following recommendations:

Recommendations for the national government

- Develop Poland's creative economy by promoting targeted plans of action at all levels, from the community to the cities to the national level. Reconcile the national cultural and social objectives with instruments of education, trade, technology and tourism.

Recommendations for the local and regional government

- Support cultural and creative industries. In collaboration with universities and other educational institutions, as well as the public and private sector, increase efforts to support creative and entrepreneurial skills among students and graduates and provide better further education opportunities. To provide a robust knowledge base in the Wroclaw creative economy, support multidisciplinary collaboration across the higher education sector and different institutions by encouraging the establishment of joint institutes, departments and institutions. In collaboration with Wroclaw's universities, sponsor an observatory on the creative sector. Establish a Cultural and Creative Industries Forum to bring together the arts academies and key stakeholders to further develop this sector and provide a vehicle for common purpose.

- In order to embed the European Capital of Culture within the fabric of the city and region, and to use the arts as a vehicle for regeneration and social cohesion, support the development of an active engagement programme that involves the universities, arts academies and the community, building on and celebrating traditional skills and broadening participation in and appreciation of contemporary arts. In collaboration with the Fine Art Academy, explore developing craft as a vehicle for widening participation by building on and celebrating traditional skills.

- Build a strong global brand for Wroclaw as a centre of culture and innovation at the crossroads of Germany, Poland and the Czech Republic to develop the knowledge base in the regional economy and to attract young creative workers and students to the region.

- To realise the full potential of Wroclaw's creative enterprise, provide specialised entrepreneurship support and business skill development for cultural and creative industries; expand existing small business and entrepreneurship programmes to provide specialised support for creative industries; develop sector support initiatives to serve creative industries more effectively; consider Creative Credit type voucher schemes to inject innovation and creativity into the traditional SME sector; create vehicles for sales development, business-to-business forums for investment and business matching to support the creative industries sector; and provide incubation space and services for creative businesses, including space to conduct business, access to shared prototyping equipment, workshops and courses on business planning and marketing, and access to potential investors.

- In collaboration with universities and art academies, undertake a review of the social and economic implications of/and opportunities offered by the cultural

and creative industries in Wroclaw and Lower Silesia. This should include a review of the academic direction of arts education in light of international experience and the socio-economic strategy for local and regional development. The review should identify new educational pathways and career opportunities for "cultural workers". It should:

- consider the structure of arts/media education, and establish clearly articulated routes from secondary and post-secondary education to higher education – embracing the full breadth of ISCED 5A, 5B and 6 provision with attention to access, accreditation and credit transfer between the arts institutions, but also in partnership with the other universities in Wroclaw.

- examine training and retraining provision in order to make available new and/or alternative career pathways.

- identify the current and future opportunities offered by the emerging cultural and creative industries and the labour market, *e.g.* for cultural workers in micro-business, homework, freelance/casual, arts organisations; determine what level of skill or knowledge will be required in the future and what are the implications for arts in terms of education, institutional organisation, pedagogy, curriculum, research, training and engagement.

- In partnership with other levels of governments, educational institutions, public and private sector employers, and trade unions, develop a long-term growth strategy for the tourism industry that responds to the needs of the Capital of Culture and also the megatrends in tourism, and guides a comprehensive approach to skills development. The outcome should be the alignment of industry needs with detailed competency development in education. Bridging the gap between the education provision and industry needs requires revision of curricula, including entrepreneurship skills, up-skilling of educators, work-based and experiential learning opportunities, linkages and pathways between vocational training and higher education, and the provision of new delivery models with greater flexibility, especially for lifelong learning and up-skilling of workers.

- Connect university research to community by supporting challenge-driven research through competitive calls. In order to make the connection between the current research focus and community engagement, "translational research" could be adapted to address the critical issues in Wroclaw and Lower Silesia. In addition, university leaders could develop initiatives supported by small research grants to encourage faculty to undertake research activities that connect with community agendas.

- Transform emerging local community centres into creative learning centres and community hubs to pool and mobilise the emerging academic expertise in community engagement that is spread across different departments and institutions. Linking creative community programming to local economic development and revitalisation of at-risk neighbourhoods through co-production where the local community is engaged in the development and implementation of the projects. Launch pilot projects in communities such as Nadodrze and the suburbs to leverage local resources, capitalising on existing organisations and knowledge of community issues and conditions.

- Extend Wroclaw's regeneration strategy to universities and art academies by developing a "cultural quarter". Promote greater collaboration in space management and a collaborative long-term strategy for Wroclaw's physical environment that is relevant to creativity, learning, research, business and society. In collaboration with the higher education institutions, develop a city-wide strategic plan for the coherent development of facilities for learning and research that supports the needs of individual universities, businesses and the community, and creates a connected, city-wide learning environment. To achieve this: develop a shared vision with a range of stakeholders; map the current uses of buildings and public spaces across the city, including landmarks, and vistas and the transport infrastructure; design alternative scenarios for development; select a scenario that meets the needs and expectations of the stakeholders; and create a strategic framework that identifies the mix of different environments and uses, a coherent transport infrastructure, the massing and character of the city, a time frame for overall development and transition, and public and private investment needed.

Recommendations for arts academies and universities

- Review the curriculum and develop RDI capacity and capability in the art academies in order to modernise and enhance their academic mission and labour market relevance in the context of international developments in collaboration with the representative bodies for creative arts and media education.

- Develop interdisciplinary and practice-led research capacity and capability in order to strengthen the academic and international profile of the art academies and to open up new opportunities for graduates, as the creative and cultural industries are knowledge-intensive sector.

- Contribute to the social and cultural inclusion of the local and regional population through the university arts and humanities programmes, which include creative contributions by various population groups.

- Contribute to the development of the local and regional creative economy by developing and expanding multi-disciplinary programmes and programmes in entrepreneurship and non-profit management, both in formal degree programmes and through outreach efforts.

- Develop university knowledge and technology transfer programmes to focus on the potential for development of productivity-enhancing product and process innovations in cultural and creative fields in Wroclaw and the wider region, particularly in design.

Notes

1. In the UK, the creative industries contributed over GBP 50 billion to the economy, generating spill over benefits for other sectors that work with them to create innovative products and services. In Germany, total turnover of the culture and creative industries was estimated at EUR 132 billion in 2008, contributing EUR 63 billion towards value added and representing 2.5% of the GDP. In 2007, the creative industries accounted for 6.4% of the U.S. economy, making it one of the larger exporting sectors in the US economy, worth USD 125.6 billion. In Canada, the cultural sector provided 3.5% of GDP and almost 6% of the growth in value added (GVA). In Australia, the creative economy has grown for nearly two decades with 5.8% annually. In 2007-2008 the Australian creative economy was worth AUD 31 billion (Australian dollars), employed about 5% of the workforce and generated 7% of national earnings.
2. According to Richard Florida, regional growth requires educated people, a talented workforce, a base of economic activities and tolerant, open-minded, and diverse "people climate" that is associated with a broad range of elements that influence the milieu and atmosphere of a city. Low entry barriers, such as openness toward newcomers and open-mindedness toward different cultures and different norms, help regions compete for

talent. A good "people climate" attracts and retains creative and talented people, who, in turn, fertilise the ground for a competitive business climate. Finally, a good and competitive business climate has positive impact on economic growth.

3. Multidisciplinarity is a distinct feature in creative arts and media. Creative arts and media is a critical knowledge domain and research base for the creative industries (KEA European Affairs, 2006). It takes an inter- and multi-disciplinary approach, including music, drama, dance, film, broadcasting, gaming, architecture, ICT, etc. The main representative bodies for higher education creative arts and media institutions in Europe, such as ELIA, Cumulus, AEC and Cilect (see also ICFAD, 2012) all act on the basis of this distinction.

4. The UNESCO Heritage list currently includes 962 properties of cultural and natural heritage that the World Heritage Committee considers as having outstanding universal value. These include 745 cultural, 188 natural and 29 mixed properties in 157 states. As of March 2012, 189 state parties had ratified the World Heritage convention.

5 . Cultural tourism focusing on heritage sites has become a rapidly growing industry in many countries and cities over the last decades, supported by the UNESCO World Heritage List (UNESCO, 2012).

6. There are more than 8000 historic buildings that represent a unique cultural asset for the region. Wroclaw is home to an Olympic Stadium, the Centennial Hall, 13 theatres, six museums, a philharmonic hall, and an opera house. Wroclaw's District of Tolerance includes an Orthodox church, a Roman Catholic church, a Lutheran church, and a synagogue.

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Annex 4.A.1. The growth of social networks and Nasza Klasa.pl

Social networks, such as Facebook, YouTube and Wikipedia, are rapidly expanding and changing the creative economy. More than 200 social networking sites operate globally. They foster peer-to-peer relationships among people, between an individual and a product or brand (Facebook) or between complementary products (Amazon). Government agencies, political campaigns and educators are increasingly using social networking tools. People spend more than 110 billion minutes each month on social networks and blog sites, corresponding to 22% of all time spent online, or one in every four and half minutes. The number of people visiting blogs and other social media sites increased by 24% over last year, and for the first time ever, three-quarters of global consumers who go online now visit such sites. The average visitor spent almost 6 hours on social media sites in April 2010 versus 3 hours, 31 minutes in 2009, 66% more time than in 2009.

Many creative enterprises use social network services to offer their goods and services to wider audiences, often reaching global markets. By connecting people at low cost, social networks help creative entrepreneurs and small businesses expand their business contacts and clients, and promote their brands. Social networks act as a customer relationship management tool for companies selling products and services. New platforms such as blogs, forums and wikis facilitate connectivity among creative people, products and places. Social networking services use computer software to build and verify online communities. Mobile devises provide a more conducive platform for social networking than desktop computers: 91% of the people who access the web from smartphones and other mobile devices visit social networking sites, compared to 79% of those who access the Internet from a desktop computer.

The Nasza Klasa social network portal was established in November 2006 by three students of Wroclaw universities (Maciej Popowicz, Paweł Olchawa, Michał Bartoszkiewicz, Łukasz Adziński). Within a month after the launch, Nasza Klasa had 100 000 users. During the peak year of 2008, its daily growth could exceed 100 000 users. In 2010, the portal numbered 14 million user profiles out of 38 million people in Poland (albeit 6% of user accounts were not in usage). Two years after the launch, the student entrepreneurs sold Nasza Klasa to investors, but retained shares. The value of the social network was estimated at PLN 15 million in 2007.

Source: UN (2010), *Creative Economy Report 2010. Creative Economy: A Feasible Development Option*, United Nations, *http://unctad.org/en/Docs/ditctab20103_en.pdf*.; (2009); Ruder Finn (2012), Mobile Intent Index, *www.intentindex.com/mobile*.

Annex A. Review Team Members

Jaana Puukka is an international higher education expert, currently serving the OECD Education Directorate as a project manager and analyst in the Policy Advice and Implementation Division. She joined the OECD Programme on Institutional Management in Higher Education in 2005 to lead the OECD multi-annum activity in Higher Education in Regional and City Development which has involved reviewing the impact and engagement of higher education institutions in more than 30 cities and regions in over 20 countries. She has coordinated three subsequent rounds of reviews and personally led more than 15 reviews to Andalusia (Spain), Berlin (Germany), Bio Bio Region (Chile), the Basque Country (Spain), Catalonia (Spain), the Free State (South Africa), the Galilee (Israel), Lombardy (Italy), the Paso del Norte region (US/MX), the State of Penang (Malaysia), Southern Arizona (US), the State of Victoria (Australia), Wroclaw (Poland) and has been the lead author for these reviews as well as for the reviews of State of Parana (Brazil), the State of Veracruz (Mexico) and Antioquia (Colombia). She has provided policy advice to national and sub-national governments and tertiary education institutions worldwide. She is the co-author and editor of the OECD publication "Higher Education and Regions – Globally Competitive, Locally Engaged" (OECD, 2007), the editor of the "Post-secondary Vocational Education and Training: Pathways and Partnerships" (OECD, 2012) and the forthcoming publication "Higher Education in Cities and Regions – For Stronger, Cleaner and Fairer Regions". Before joining the OECD, Puukka was engaged in higher education and local and regional development in Finland as a national and local government adviser, programme manager, practitioner and evaluator. She has held management, expert and advisory positions in the higher education sector, and has worked in university internationalisation, institutional evaluation, regional development, PR & communication and stakeholder management. Her corporate sector experience comes from the biomedical industry.

Bonifacio Agapin is a consultant in the OECD work on Higher Education and Regional and City Development. He joined the OECD Education Directorate in January 2010 first contributing in the Quality in

Teaching Project and then in the Centre for Effective Learning Environments (CELE). Prior to joining the OECD, Agapin worked for several years in the US public education sector as a Foreign Credentials Evaluator and as a Postgraduate Student Counsellor in the UK.

Małgorzata Kuczera joined the OECD in 2005 and is currently part of the team working on Skills beyond School the Review of postsecondary vocational education and training (VET). She is a co-author of "Learning for Jobs" the OECD's recent review of VET at secondary level. As part of this exercise she reviewed VET systems throughout the world, and is the lead author of reviews in 6 countries. Prior to this project she worked on the review of equity in education at the OECD. She is a co-author of the OECD book "No more Failures: Ten Steps to Equity in Education". Before joining the OECD she worked at the European Commission on the issue of efficiency and equity in education.

Patrick Dubarle, former Principal Administrator at the OECD Public Governance and Territorial Development Directorate (GOV), has co-ordinated and contributed to a number of OECD territorial reviews at the national and regional level and has also participated to many case studies within the framework of the OECD programme on Higher Education Institutions and City and Regional Development. He joined the OECD in 1978 as Administrator in the Directorate for Science Technology and Industry. He was appointed Secretary of the OECD Working Party on regional development policies in 1992, where he was responsible for country regional policy reviews and horizontal programmes. He has worked with national governments in many OECD countries and has spoken at several international conferences. He is the author of documents on high technology policies and sectoral questions including space industry, technological change, technology fusion, innovation and higher education in regional development. He is presently a consultant for the European investment Bank, the OECD and the French Agency for Higher Education and Research Institutions' Assessment.

John Goddard, is an expert in the field of higher education institutions' engagement in regional development. He was previously Deputy Vice-Chancellor with responsibility for the University's links with the city and region, in particular the development of Newcastle as one of the UK's six Science Cities. He also led the implementation of a major restructuring of the University. Goddard has more than 30 years experience in regional development as a policy developer, regional practitioner, researcher and evaluator. His academic background is in economic geography. He founded and led the University's Centre for Urban and Regional Development Studies (CURDS) and directed numerous academic and policy research

projects on the role of innovation in territorial development. His international work includes collaboration with the OECD and reviews of regional engagement by Finnish Universities sponsored by the Finnish Higher Education Evaluation Council. He is currently working with DG Regio of the EC on universities and regional development and a member of its Smart Specialisation Platform, advising the European Universities Association on a DG Research study of Collaborative Research and leading a DG Education and Culture Lifelong Learning project on building partnerships between universities, business and public authorities.

Ellen Hazelkorn is Vice President of Research and Enterprise, and Dean of the Graduate Research School, Dublin Institute of Technology (DIT), Ireland; she also leads the Higher Education Policy Research Unit at DIT. Hazelkorn contributes to the OECD IMHE Programme and is also associated with the International Association of Universities (IAU). She is a member of the Higher Education Authority (Ireland), and Chairperson of the Dublin Regional Higher Education Alliance. Hazelkorn has been a member of international, national and institutional review teams, including Australia (2009), Netherlands (2010), Spain (2010), Finland (2011), Germany (2012). She is a member of Management Board for the Irish National Digital Research Centre (NDRC). She is Visiting Professor at University of Liverpool, and member of three Editorial Boards. Hazelkorn has over 16 years senior management experience in higher education. She is an acknowledged expert on university rankings and the impact on higher education and higher education policy, on higher education systems and university strategy, management and leadership of higher education institutions, and research policy and institutional strategy.

Annex B. Programme of the review visit

OECD Review Visit to Wroclaw, 19-24 February 2012

Sunday, 19 February

18:00 – 19:30 **OECD review team internal meeting**

20:00 – 22:00 **Meeting with Steering Committee Chairman and Regional team**

- Prof. Tadeusz LUTY, Chairman, Steering Committee
- Maciej LITWIN, Regional Co-ordinator
- Tomasz JANOŚ, Wroclaw Academic Hub
- Małgorzata CEBRAT, PhD, Institute of Immunology/Young Scientists and Artists' Academy
- Maciej ZARAŃSKI, Wroclaw University of Environmental and Life Sciences

Monday, 20 February

09:00 – 11:00 **Thematic meeting on Wroclaw development strategy** *(Council Club)*

- Rafał DUTKIEWICZ, PhD, Mayor of Wrocław
- Jacek SUTRYK, Head of Welfare Department, City of Wroclaw
- Jacek BARSKI, Head of Architecture and Development Department, City of Wrocław
- Dariusz OSTROWSKI, President, Wroclaw Agglomeration Development Agency
- Tomasz GONDEK, Vice-President, Wroclaw Agglomeration Development Agency
- Adam GREHL, Deputy-Mayor of Wroclaw
- Prof. Tadeusz LUTY, Advisor to the Mayor, Strategic Director, WAH
- Maciej LITWIN, Head of University Relations Office/Executive Director at Wroclaw Academic Hub
- Tomasz JANOŚ, Wroclaw Academic Hub
- Marzena HORAK, Economic Development Office, City of Wrocław

11:10 – 11:45 **Meeting with Wroclaw branch of Statistical Office and Labour Market Observatory** *(Wroclaw Academic Hub)*

- Małgorzata WOJTKOWIAK-JAKACKA PhD, Head of Statistical Office in Wrocław
- Agnieszka ILCZUK, Head of Lower Silesian Centre for Regional Research
- Prof. Piotr ŻUK, Observatory of Lower Silesian Labour and Education Market

11:45 – 13:15 **Working lunch with business leaders and business associations**

- Jacek LEVERNES, Association of Business Service Leaders
- Prof. Ewa KURANTOWICZ, University of Lower Silesia
- Marek WORON, Chancellor of Business Centre Club

13:30 – 16:30 **Institutional visit: Pracze Campus and Wroclaw Research Centre EIT+** *(Wroclaw Research Centre EIT+)*

- Prof. Mirosław MILLER, President/CEO
- Katarzyna SWINARSKA, Project management Office Director
- Magdalena ORNATOWSKA, PhD, Director of Life Science Department
- Lukasz NIERADKO, PhD Director of Nanotechnology Department
- Radosław PIESIEWICZ, Director of R&D: ICT Development
- Cezary LEJKOWSKI, Manager of Department of Climate and Energy
- Prof. Tomasz MROCZKOWSKI, member of Advisory Board
- Dr Haim LEVY, Consultant for research projects
- Adam SZATKOWSKI, PhD, Nanotechnology expert and specialist for project acquisition and evaluation
- Paweł WIELGUS, PhD, Key Account Manager
- Marek DRAB, PhD, Major research co-ordinator

17:00 – 17:30 **Individual meeting with regional authority representative (Jaana Puukka)**

- Bartłomiej OSTROWSKI, Head of Foreign Relations, Lower Silesian Executive

Tuesday, 21 February

09:00 – 12:00 **Institutional visit: University of Wroclaw**

- Prof. Marek BOJARSKI, Rector
- Prof. Adam JEZIERSKI, Vice-Rector
- Prof. Ryszard CACH, Vice-Rector
- Tomasz NICIAK, Head of Academic Incubator of the Entrepreneurship

- Urszula BRODA, Head of International Office
- Prof. Adam J. CHMIELEWSKI, Institute of Philosophy
- Prof. Jacek OTLEWSKI, Dean of Faculty of Biotechnology
- Prof. Leszek PACHOLSKI, former Rector of the University of Wrocław
- Prof. Adam PAWŁOWSKI, Institute of Information and Library Science
- Prof. Jakub PIGOŃ, Vice-dean of the Faculty of Philology
- Prof. Grzegorz PLEBANEK, Deputy Dean of the Department of Mathematics and Computer Science
- Prof. Stanisław STAŚKO, Dean of the Faculty of Earth Sciences and Environment Management
- Prof. Wiesław WĄTOREK, Vice-Dean for Student Affairs Faculty of Biotechnology
- Emilia WILANOWSKA, Head of Foreign Projects Office
- Prof. Jan Michał BURDUKIEWICZ, Vice-Dean of Faculty of Historical and Pedagogical Science
- Prof. Elżbieta KOŚCIK, Dean of Faculty of Historical and Pedagogical Science
- Prof. Maciej MANIKOWSKI, Vice-Dean of the Faculty of Social Sciences
- Prof. Jerzy SUPERNAT, Deputy Head of the Institute of Administrative Studies
- Bożena TYTOŃ, Head of Department of Scientific Research
- Prof. Przemysław WISZEWSKI, Vice-director of Institute of History
- Prof. Piotr MACHNIKOWSKI, Head of the Department of Civil Law and Private International Law

12:00 – 13:30 **Meeting with students**

- Piotr SZYMAŃSKI, PhD Student, Wroclaw University of Technology
- Witold DZIUB, University of Wrocław, Independent Students' Association
- Oleksandra NOVOSAD, Wroclaw University of Economics, international student
- Smantha FRANCO, University of Wrocław, international student
- Anna SZLACHCIC, University of Wrocław

14:00– 16:00 **Thematic meeting on social development and urban regeneration** *(Infopunkt Nadodrze)*

- Jacek PLUTA, PhD, University of Wrocław
- Katarzyna KAJDANEK, PhD, University of Wrocław
- Mateusz BŁASZCZYK, PhD, University of Wrocław
- Maciej ZARAŃSKI, Wroclaw University of Environmental and Life Sciences
- Sebastian WOLSZCZAK, Urban Regeneration Programme Manager, City of Wrocław
- Kamila KAMIŃSKA, PhD, University of Wrocław
- Anna SZARYCZ, Head of Health Department, City of Wrocław
- Maja ZABOKRZYCKA, Head of Infopunkt Nadodrze
- Łukasz URBANEK, Lower Silesian Executive

- Bohdan ANISZCZYK, PhD, Member of the Wroclaw City Council, Chair of Education Committee
- Olga RADUCHOWSKA, City of Wrocław, Project Manager "Educational Facilities Energy Management"

Wednesday, 22 February

09:00 – 12:00 **Institutional visit: Wroclaw University of Technology**

- Prof. Tadeusz Więckowski, Rector of Wroclaw University of Technology
- Prof. Jerzy Walendziewski, Vice-Rector for General Affairs
- Prof. Cezary Madryas, Vice-Rector for Development
- Prof. Eugeniusz Rusiński, Vice-Rector for Research
- Prof. Andrzej Kasprzak, Vice Rector for Education
- Dr Inż. Zbigniew Sroka, Vice-Rector for Student Affairs
- Dr Inż. Andrzej Moczko, Adviser of Vice-Rector for Development
- Damian Derlukiewicz, Tutor
- Anna Tyszkiewicz, Translator
- Prof. Jan Koch, Wroclaw Centre of Technology Transfer
- Prof. Edward Chlebus, Dean of the Faculty of Mechanical Engineering

12:30– 14:00 **Lunch meeting with regional authority representatives**

- Radosław Mołoń, Member of the Lower Silesian Executive Board in charge of education
- Józef DYMALSKI, Head of Social Affairs Department, Lower Silesian Executive
- Leszek RYK, PhD, Lower Silesian Executive

14:30 – 16:30 **Thematic meeting on moving HE towards the skills agenda** (*Wroclaw University of Economics)*

- Prof. Jerzy KORCZAK, Head, Chair of IT, Wroclaw University of Economics
- Prof. Bogusław FIEDOR, Rector, Wroclaw University of Economics
- Jolanta JAWORSKA, IBM Poland, Association of Business Service Leaders
- Anna OGŁY, PhD, Head of Continuing Education, Wroclaw University of Environmental and Life Sciences
- Prof. Piotr WRZECIONIARZ, Business Centre Club / Wroclaw University of Technology
- Prof. Wiesław WĄTROBA, Wroclaw University of Economics, Alumni network
- Prof. Jarosław WITKOWSKI, Vice-rector for International Co-operation, Wroclaw University of Economics
- Marcin PAWĘSKA, PhD, International University of Logistics and Transport in Wroclaw
- Prof. Józef DZIECHCIARZ, Kuźnia Kadr, University of Economics

16:45 – 17:30 **Meeting with regional business sector leader** (*Lower Silesian Chamber of Commerce)*

- Zbigniew SEBASTIAN, PhD, Head of Lower Silesian Chamber of Commerce

Thursday, 23 February

09:00 – 11:00 **Linking talent and technology in SMEs: thematic meeting at Wroclaw Technology Park**

- Prof. Maciej CHOROWSKI, President, Wroclaw Technology Park
- Łukasz MIROSŁAW, PhD, CEO, Vratis Ltd.
- Kamil RUDNICKI, CEO, Time Solutions Ltd.
- Wiesław BŁYSZ, CTO, Research and Engineering Centre Ltd.
- Prof. Tadeusz TRZISZKA, Nutribiomed Cluster, Academic Leader
- Krzysztof BEREZOWSKI, PhD, Research and Engineering Centre Ltd.
- Joanna KUŁDO, PhD, Project Manager, WTP/Nutribiomed Cluster
- Tomasz SAJEWSKI, CEO, My Challenge
- Urszula BIELECKA, Account Manager, My Challenge
- Michał ALZAO, My Challenge

11:30 – 13:30 **Thematic meeting: beyond the new legislation of 2011. National perspective [working lunch with Ministerial representatives]**

- Mateusz GACZYŃSKI, Vice-director of Strategy Department, Ministry for Science and Higher Education
- Ewa ANNUSEWICZ, Ministry for Science and Higher Education
- Prof. Jerzy LANGER, former Deputy Minister of Science and Higher Education, the science and innovation Advisor to the Mayor of Wrocław

14:00 – 16:00 **Thematic meeting on culture and creative industries** (*Academy of Fine Arts)*

- Jarosław OBREMSKI, Senator/European Capital of Culture 2016
- Igor CHILIMOŃCZYK, European Capital of Culture 2016
- Marcello MURGIA, Wroclaw Agglomeration Development Agency
- Magdalena BLUM-RAK, PhD, Vice-Rector, the Karol Lipinski Academy of Music in Wroclaw
- Prof. Jacek SZEWCZYK, Rector, Academy of Fine Arts
- Prof. Jan KUKUŁA, Academy of Fine Arts
- Jan STASIEŃKO, PhD, Department of Journalism and Social Communication, University of Lower Silesia
- Krzysztof KUBASEK, Academy of Fine Arts
- Tomasz STEFANICKI, Economic Development Office, City of Wrocław
- Marcin DREWS, Can't Stop Games

16:00 – 18:00 **Thematic meeting: on brand building and developing education offer** *(Council Club)*

- Maria HRYCENIAK, Teraz Wrocław/Wroclaw University of Economics
- Mirosław LEBIEDŹ, Teraz Wrocław/ Wroclaw University of Economics
- Paweł ROMASZKAN, Head of Promotion, City of Wrocław
- Małgorzata NASKRENT, Teraz Wrocław/Promotion, City of Wrocław
- Joanna RAŃDA, Promotion, City of Wrocław
- Marek ZIMNAK, PhD, Head of Promotion, Wroclaw University of Economics
- Magdalena BLUM-RAK, PhD, Vice-Rector, the Karol Lipiński Academy of Music
- Elżbieta OPIŁOWSKA, PhD, Willy Brandt Centre, University of Wrocław
- Prof. Joanna RYMASZEWSKA, Vice-Dean, Wroclaw Medical University
- Jarosław TOMASZEWSKI, Head of International Relations Office, Wroclaw School of Banking
- Rafał DOBEK, PhD, Rector's plenipotentiary for International Students, Wroclaw Medical University
- Dorota PETRU, Promotion, University of Lower Silesia
- Urszula KŁOBUSZEWSKA, Programs Coordinator, University of Lower Silesia

Friday, 24 February

09:00 – 11:00 **Review expert team internal meeting** (*Wroclaw Academic Hub)*

11:00 – 13:00 **Meeting with the Steering Committee: preliminary findings of the review visit** *(Council Club)*

- Magdalena BLUM-RAK, PhD, Vice-Rector, the Karol Lipinski Academy of Music in Wroclaw
- Krzysztof MAĆKAŁA, PhD, Rector's plenipotentiary for co-operation with foreign countries, University School of Physical Education
- Prof. Andrzej ŁOŚ, University of Lower Silesia
- Prof. Stefan FORLICZ, Rector, Wroclaw School of Banking
- Prof. Leszek KOCZANOWICZ, Warsaw School of Social Sciences and Humanities, Faculty in Wrocław
- Prof. Mirosław MILLER, President/CEO of Wroclaw Research Centre EIT+
- Prof. Maciej CHOROWSKI, President, Wroclaw Technology Park
- Zbigniew SROKA, PhD, Wroclaw University of Technology
- Prof. Joanna RYMASZEWSKA, Vice-Dean, Wroclaw Medical University
- Prof. Józefa CHRZANOWSKA, Vice-Rector, Wroclaw University of Environmental and Life Sciences
- Prof. Adam JEZIERSKI, Vice-Rector, University of Wrocław
- Leszek RYK, PhD, Lower Silesian Executive
- Ewa ANNUSEWICZ, Ministry for Science and Higher Education
- Prof. Bogusław FIEDOR, Rector, Wroclaw University of Economics
- Prof. Tadeusz LUTY, Chairman, Steering Committee
- Maciej LITWIN, Regional Co-ordinator
- Tomasz JANOŚ, Wroclaw Academic Hub

19.00 – 21.00 **Meeting with the Mayor of Wroclaw, Steering Committee Chair and Regional team** *(Water Tower)*

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Chapter 2. Human capital and skills development
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