

OECD Review of Higher Education in Regional and
City Development

Lombardy, Italy



Assessment and recommendations

With nearly 10 million inhabitants, Lombardy is the most populated region in Italy. The region stands out in the European landscape because of its longstanding industrial strength. It has a diverse economy, which includes a financial capital of Europe, Milan, and one of the continent's most productive agricultural sectors. The region's strength in the arts, design and craft provides the basis for constant creativity.

Lombardy is the most prosperous region in Italy; with GDP per capita about 35% higher than the European average, it represents one fifth of the whole national economy. It is also the leading region in the Italian economy as measured by total production and exports. A strong economy has contributed to foreign immigration flows, making Lombardy the most diverse region in Italy. Immigrants, which represent almost 9% of the population, are a significant potential for regional innovation and partly buffer the region from the effects of an ageing population.

Economic diversity and continued demand for regional products have made it possible for Lombardy to remain resilient in the face of the global recession. Regional unemployment has remained relatively low in comparison to many other countries because of the continued strength of many sectors in the region's economy, and because production in many of the most important industries is carried out in small and medium-sized enterprises (SME).

However, despite the strengths and resiliency of its economy, Lombardy faces critical challenges in maintaining its distinctive global position over the longer term. The region is undergoing an industrial shift towards services and knowledge-intensive activities. The manufacturing firms that will thrive in the changing environment will need to focus on differentiation and a more intense use of knowledge. Success under this emerging manufacturing model relies on the access to skilled and qualified labour,

whereas in Lombardy, only 15.9% of the working age population has tertiary education qualifications.

Lombardy has a large higher education system with some of the most specialised universities and the biggest research budget in Italy. Despite the strengths, the university sector features inefficiencies and weak alignment with the regional needs. The Regional Government of Lombardy has requested greater competencies from the central government in terms of higher education, and science and innovation in order to unleash the potential of universities for regional development. This arrangement would involve a transfer of state resources for university funding to the region. At the same time, Italian and Lombardy universities need to respond to the new requirements laid down in the 2010 law on university reform (law 240/2010), which strengthens the institutional autonomy of universities and builds their public accountability.

In this context, Lombardy and its universities need to address the following challenges:

- How to create knowledge-based jobs and improve the productivity of the SME-based economy under increasing global competition?
- How to attract and retain talent, and capitalise on the existing assets of entrepreneurialism, cultural diversity and creativity?
- How to address long-term challenges associated with the ageing demographics, immigration and environmental sustainability?
- How to improve the quality and relevance of higher education, and build capacity to transform the potential of higher education into an active asset for local and regional development?

The challenge for educators and regional policy makers in Lombardy is to find ways to make the regional education and labour market systems more inclusive for the ageing population, immigrants and women. There is a need to improve the overall educational attainment levels and upgrade the skills of the regional population. Lombardy universities should also adopt a wider innovation concept that is not solely focused on science, helps increase the knowledge intensity of jobs, fosters product and process innovation, and aligns higher education provision with the needs and opportunities of the region and its SMEs. Stronger incentives for regional engagement by universities could be provided through performance-based funding, “challenge-driven” competitive calls, and by favouring multidisciplinary and cross-university initiatives. There is a need to monitor the rate of return and effectiveness of public investment in higher education, both at the national and regional levels, and to build robust data to facilitate evidence-based decision making. The new university law needs to be supported with the

forthcoming secondary legislation to translate the principles of autonomy and accountability into operational rules and the new regulation needs to be effectively implemented. Closer collaboration between regional and local governments, private sector and tertiary education institutions is necessary.

Human capital development in Lombardy

Italy has been slow to move to a “knowledge economy” model. In Lombardy, the regional labour market has traditionally had many jobs with low skills and limited opportunities for productivity increases. To maintain its distinct global position over a long term, Lombardy needs to develop highly skilled workforce and a knowledge-based economy that can absorb it.

Italy continues to lag behind other OECD countries in terms of educational attainment despite the rapidly closing gap in the last few decades. Only about 20% of the 25-34 year olds and around 10% of 56-64 year olds have completed tertiary education in Italy, compared with the OECD average of 35% and 20%, respectively.

At the regional level, the Lombardy workforce exhibits a low level of educational attainment due to SME-based sectors, which do not require a high level of educational attainment, and the significant informal economy, which may not value educational qualifications. Higher education graduates account for 15.9% of the total population aged 25-64, which is below the European average (25.9%) and considerably below Ile de France (39.9%) and Stockholm (42.5%). Furthermore, the Lombardy economy has a higher proportion of its workforce employed in manufacturing than Italy as a whole (33.5% versus 27%). This sector is critical because it is under pressure from global competition and yet amenable to strategies that could increase productivity and expand export markets.

The regional economy features a productivity gap as a result of new low-skilled workers entering the labour market and the low levels of educational attainment in sectors where other European regions show high levels of educational attainment. Lombardy ranks at the bottom of the top 25 European high tech regions with respect to the educational credentials of its professional and technical labour force in the high tech sectors. This deficiency is reflective of a national pattern of under-investment in technology, including technologically-advanced human capital.

While higher education participation has improved in Italy and Lombardy, the university system demonstrates inefficiencies in graduate production, such as low retention rates, long duration of studies and late entry to the labour market, partly caused by the under-developed student support system.

In Italy, the entry rate to type A tertiary education programmes is 51%, compared to the OECD average of 56%. Growing enrolments have been a result of a massive increase in the number of youth completing secondary education. Since the 1970s, access to Italian universities has been granted to students that have successfully completed secondary education, including technical and vocational programmes. These trends are replicated in Lombardy, which today caters for about 13% of Italian student population.

Improved entry rates to higher education are undermined by the lack of efficiency in graduate production. Italy has the highest dropout rates among all the OECD countries, with completion rates from type A tertiary education programmes at 45% against an OECD average of 69%. In Lombardy, the dropout rate for universities was 11.2% (between the first and second year), below the national average of 17.6%, but featuring considerable differences between the region's public and private universities (18.5% and 6.5% respectively). In addition, students enter the labour market older than in OECD countries in general.

Increasing efficiency in higher education would require improving financial, social and academic support for students. High dropout rates and long duration of studies are partly a consequence of limited student support, which results in a significant number of students working. As noted by the OECD (*OECD Economic Reviews: Italy, 2011*), Italy needs a system that encourages completion of studies by all students and, at the same time, reduces financial constraints on students from low-income households. A solution could be the introduction of a universal income-contingent-repayment loan system where graduates repay the loan if they find a job and if their earnings exceed a threshold. In addition, means-tested grants schemes should be considered to ensure access of students from low socio-economic backgrounds. While public funding is under increasing pressures in Italy, a higher degree of private financing for higher education needs to be considered.

Lombardy features Italy's most dynamic economy with a traditionally absorptive labour market. However, graduate unemployment in Lombardy is a structural problem, which the economic crisis has aggravated. There is considerable variation how universities facilitate students' entry to labour market and address the skills needs of the region.

Graduate unemployment in Lombardy, the country's most dynamic economy, is a structural problem, which the economic recession has aggravated. Five years ago, 40% of new graduates in Milan found a job with a long-term contract; today, the figure is only 20%. Out of approximately 50 000 graduates in 2008, only 10 000 received a stable work contract in 2008 and 2009, while another 20% received no work opportunities at all. 60% received very short-term and precarious jobs.

There is considerable variation among the universities in Lombardy in facilitating students' entry to the labour market and in addressing the skills needs of the region. While the Politecnico di Milano, Bocconi University and Carlo Cattaneo University - LIUC are running well-resourced career services and have close linkages with the industry, in general the university career services are weak with limited connections to the labour market. Innovative approaches often remain university- or discipline-based, benefitting only a small proportion of Lombardy students, with a lack of wider dissemination throughout the higher education sector.

Lombardy would benefit from a more demand-driven education provision that is aligned with the needs of the region. This would require reforming the traditional teacher-centred learning models to strengthen the skills and competencies of students, and building stronger links between higher education and the labour market. This could be achieved through a wide range of measures, including more systematic work-based learning for students, for example, through co-op education in collaboration with the local industry and other employers; participation of employers in the curriculum, course design and delivery; and tracking of student progress, achievement and labour market outcomes.

Collaborative action has been taken to improve the match between the labour market supply and demand (VULCANO service), and to provide labour market information (public-private SPECULA project) but so far these mechanisms have operated at a sub-optimal level. The universities themselves need to establish an appropriate method of tracking the student progress and graduate employment outcomes as a way of informing curriculum development and a better understanding how education meets the needs of the society and economy.

Industry associations in Lombardy play a key role in developing mechanisms to align education provision with the regional needs. These include the “Roundtable of Co-ordination” between Assolombarda and the universities in Milan and Pavia, which aims to align curriculum development with the requirements of the business community or specific industry sectors. Assolombarda is also actively involved in promoting master’s and PhD programmes to enhance innovation and knowledge transfer from university to industry (e.g. executive research doctorate offered by Politecnico di Milano). This type of activities should be more widely disseminated throughout the university sector in the region.

Lombardy has a rapidly ageing population, low labour market participation and one of the most negative elderly dependency rates in Europe. There is a need to strengthen the policy focus on lifelong learning in order to extend the productive lives of the workforce and to make its education and labour market systems more inclusive.

Lombardy’s economic model is challenged not only by low human capital development, but also demographic trends linked to poor labour market performance. About 20% of the Lombardy population was over 65 years in 2008, and the proportion is projected to grow to over 26% in the next few years. The rapidly shrinking labour force is typical to Italy, which has the highest elderly dependency ratio in the OECD, second only to Sweden. The elderly tend to retire earlier, further reducing the labour market participation rates. Lombardy’s labour markets have also relied on informal and/or low skilled workers, and generally do not encourage women’s participation.

There is considerable scope to enhance lifelong learning in Italy and Lombardy. Italy ranks among the weakest OECD countries in lifelong learning. In 2005, the percentage of the Italian adult population that took part in continuing education was 6.2%, compared with the European average of 10.8% and the Lisbon objective of 12.5% (by 2010). In Lombardy, there is a lack of robust regional level data about the access of mature students to higher education and adult education programmes, which suggests a lack of policy focus.

In view of the ageing population and need to extend the productive lives of the workforce through up-skilling and re-skilling, Lombardy universities’ response has been fragmented without evidence of collaborative action. Most universities have a centre for continuing learning, but part-time courses for adult learners and employees are rare and lifelong education for

those who are trying to re-enter the job market are underdeveloped. While there are targeted efforts to provide management education programmes for large company owners and managers, there is a dearth of educational initiatives aimed at smaller firms and at mid-level technical and professional personnel who may have considerable work experience in an industry and could significantly benefit from process and product innovation oriented degree and certificate programmes.

The Lombardy regional government has taken measures to address the lifelong learning needs by creating a “demand pull” for further training and skills upgrading, and strengthening the vocational tertiary education sector, but currently there is little evidence of co-ordination between the education providers or monitoring and evaluation in order to ensure returns on investment. In 2005, the regional authorities introduced a voucher system (Lombardy Dote System) with the aim to develop a demand-driven lifelong learning system that would widen the access of traditionally under-represented groups, encourage employees to acquire new skills and competencies and facilitate re-entry to the labour market. In 2006, the regional government supported the creation of 31 professional training institutes, *Poli formativi*, that aim to increase the educational attainment of technical and professional workers currently employed in and entering the region’s high tech manufacturing sector and knowledge-intensive services sector. The programme provides funding for advanced training of technical workers and skilled operatives utilising the resources of higher education institutions, and builds links between the different components of the education sector and the labour market. So far no comprehensive evaluation has been made of the impacts of these systems.

The Lombardy economy has benefitted from foreign immigration flows, making it the most diverse region in Italy. Integrating immigrants into the education and labour market are important challenges to Lombardy and its higher education institutions. At the same time, greater collaborative efforts are needed to attract and retain talent in Lombardy.

As a result of immigration flows from a diverse set of countries, Lombardy is the most diverse region in Italy, counting 25% of the country’s documented immigrant population and 9% of the regional population. The number of foreign students attending primary and secondary schools has quadruplicated since 1998. In 2009, 40.5% of foreigners possessed a secondary school certificate, while 14.2% are higher education graduates.

The Lombardy regional government wishes to inject a greater degree of internationalisation into the regional economy, but has so far not attracted enough talent or launched large scale programmes to train its growing immigrant pool. There is limited evidence of an integrated approach to the issues arising from the demographic transition. Challenges include talent attraction and retention, lifelong learning, mentorships and apprenticeships for younger people to enable them to move into positions of responsibility; and recognition of the need to integrate the immigrant communities socially and culturally, along with their integration into the formal education and labour force.

Integration of immigrants into a regional workforce and education system is complicated by the number and interests of actors. Lombardy could respond to this complexity by, for example, adopting a framework approach to integrating the immigrant workforce, based on the widely recognised Canadian system, which integrates multi-cultural awareness, job training and credentials recognition. In order to avoid waste in human capital investment, Lombardy should also develop mechanism to evaluate and recognise the qualifications and work experience of immigrants. Here, the Swedish experience from the Malmo Validation Centre and the Malmo University could be useful.

The university sector in Lombardy has, so far, played a peripheral role in addressing the challenges and opportunities linked to immigration, but its role is likely to increase in the future. Presently, only a few immigrants are entering the university system in Lombardy. While resident foreign immigrant account for 14% of the 20-28 year-old population, their share of the total student population is below 5.5%. Universities' role will need to grow as the young immigrant population will soon constitute a substantial portion of those age-eligible to participate in post-secondary education programmes. The upcoming generation of higher education students will be culturally diverse and often from families with lower educational attainment. The educational system from primary school onward must adapt to educate a more diverse population of children and to prepare them for higher education. The Lombardy region and its universities could benefit from the example provided by Victoria University in Melbourne (Australia), which has developed a comprehensive approach to widening access and improving success of a diverse student population. This involves long-term collaboration between universities and schools that prepares students for their successful entry and progress to higher education.

The region and its universities should make greater efforts in attracting international talent and retaining graduates of its higher education system. Currently, limited efforts have been made to attract international students and faculty, apart from highly successful artistic and musical institutions

(AFAM) and a handful of universities. Lombardy region and its universities could examine the experience of the ICREA programme in Catalonia, which not only attract top researchers (many with Catalan background), but also includes a strand to help retain and motivate top university professors in Catalonia. Thus, a comprehensive internationalisation policy for higher education would require not only the exchange of students and staff, signing of agreements with peer institutions and participation in international organisations, but also participation in the attraction of talent and foreign direct investment to the region, introducing a global, international and intercultural dimension in the teaching, research and public service activities, and linking local companies with the global networks.

Human capital challenges associated with an SME sector include the ageing of the entrepreneurial workforce and enterprise succession, and increasing the knowledge-intensity and productivity of SME production. Lombardy needs to establish technologically advanced new firms, particularly in traditional sectors, link existing entrepreneurs with students and migrants, and support entrepreneurial skills among its student population.

There is a problem of succession planning in SMEs, which is increased by the inability of the traditional sectors to incorporate a more technologically skilled workforce and demonstrate the capacity to grow and expand into new markets. The demonstration of technological vitality would attract new investors and entrepreneurs to the high quality but currently stagnant sectors of the regional economy. Thus the challenge of finding ways to upgrade human capital skills and increase the vitality and productivity of the traditional sectors, such as those in small-scale manufacturing, is related to the succession issue.

Solutions to the succession issue are likely to be found in the establishment of new firms that are more technologically advanced but within the traditional industries. These advanced technologies and skills should be identified and encouraged via programmes to increase their human capital capacities. There is a need to provide retraining opportunities to existing entrepreneurs and create a formal apprenticeship system that could help transmit tacit knowledge.

Lombardy universities could play a stronger role in enterprise support. While universities in Lombardy have taken steps to boost university spinoffs

and graduate entrepreneurship, there is limited evidence of enterprise support being mainstreamed within degree programmes and through supporting infrastructures. Where such support exists, it remains fragmented with limited collaboration between universities. The regional government in Lombardy could consider steering universities to develop entrepreneurship programmes with stronger alignment with the regional needs, to facilitate SME succession as has been done, for example, in Finland.

Entrepreneurship among the immigrant community should also be encouraged through mentorship programmes and innovative financing vehicles, such as revolving loan funds. Immigrant communities could provide successors to ageing managers and owners of enterprises in small-scale manufacturing and other traditional sectors. The need for this kind of transition effort has been recognised by the regional Chamber of Commerce, whose native Italian enrolment has been shrinking. The Chamber of Commerce identifies and publicised examples of success by immigrant entrepreneurs to provide role models. This kind of initiative could be expanded through mentorship programmes to connect existing enterprise owners with immigrant entrepreneurs.

The following measures would promote human capital development in Lombardy:

Recommendations for the national policy

- *Consider increasing private financing and cost-sharing in higher education.* Address the issues of affordability and retention in higher education by introducing a universal income-contingent-repayment loan system where graduates repay the loan if they find a job and if their earnings meet a threshold. Back up the loan system by a means-tested grants scheme to ensure that students from lower socio-economic backgrounds have access to education.
- *Review the achievements of the Bologna process and continue the process of curriculum reform* in universities across Italy in order to develop a workforce with 21st century skills and competencies.
- *Support diversity in tertiary education system by developing the vocational tertiary education sector and enhancing its links with universities.* The tertiary education sector needs to work as a diversified and integrated system in order to address the needs and the demands of the student population and industry.

Recommendations for the regional government

- *Develop a wider portfolio of robust data in the region to support evidence-based decision-making and targeted efforts to foster human capital development.* The most effective region-wide graduate labour market systems are based on the collection of comprehensive labour market intelligence, on-line publication of the data in a single place to improve students' ability to make rational choices about their studies, and to help graduates and employers to come together and students to move into employment. In Lombardy, strategic information gathering should be directed at the specific human capital issues facing the region and at models to address those issues that are appropriate to the regional situation.
- *Create a Strategy for Human Capital and Skills Development.* Universities and the key private and public sector stakeholders in Lombardy should work together to develop a long-term strategy for regional human capital and skills development to: *i) define region-wide goals, policies and priorities extending from primary to tertiary education and beyond; ii) support more inclusive education and labour market for the ageing segments of the population, immigrants and women; and iii) provide lifelong learning activities, including up-skilling and re-skilling for the adult population and those who combine work and study, or are unemployed.* Productive working lives of the workforce could be extended through lifelong learning initiatives, programmes that connect retiring business owners with young entrepreneurs and collaborative action for comprehensive training in health sector to address the challenges of an ageing and more diverse population.
- *Develop strategies to increase the supply of knowledge-intensive workers and integrate them in the sectors in which the region has comparative advantages.* This will enhance higher education institutions' participation in revitalising the existing SME sectors, encourage productivity enhancing advances in those sectors, and make connections that would assist in the SME succession problem. In crafting strategies to increase knowledge-based human capital and knowledge-intensive businesses, higher education institutions programmes need to recognise and work with the existing highly-organised industry. Conventional research university technology transfer models, distanced from the local industry, do not address the critical productivity and innovation problems facing Lombardy industries. In some instances, closer connections between the industries in Lombardy and university or vocational education resources may require changes in

national or regional regulation governing the activities of staff and faculty of regional universities.

- *Increase diversity within the regional higher education system.* Reinforcing type B tertiary education is particularly important for Lombardy. Taking advantage of the experience gained with the Poli formativi, engage in a concerted effort to determine what aspects of the Poli formativi initiative could be developed and extended. Build strong relationships between the different components of the tertiary education sector, mainly universities and higher vocational institutions is a key element of effective human capital development of a region.
- *Work together with the universities to strengthen the labour market relevance of university education and alignment with the regional needs in a systematic way.* Universities need to focus on the employability and entrepreneurial skills of graduates, and provide them with the skills and competencies needed in the globalised knowledge economy through new modes of learning, including work- and problem-based learning methods, and programmes that build entrepreneurial and innovative mindset.
- *Balance the need to increase productivity through intensive and technologically sophisticated work, with the need to employ and raise the skills of the sizeable immigrant population with low skills and low educational attainment.* Methods of accrediting and recognition of prior higher education qualifications and work experience from foreign countries must be established and also the framework approach to raise multi-cultural awareness, job training and the employability of migrants should be strengthened. This challenge may also require a “bridging and integrating” strategy to enable immigrant children to access higher education when they become a more significant portion of the population of an age to enter higher education.
- *In collaboration with universities, schools and business sector, develop long-term efforts to increase the access and success of students in higher education including those from lower socio-economic and/or migrant background.* Given that the skills of these students will constitute an important part of the future human capital of the region, this critical issue needs to be addressed. These efforts should build on international best practice models of effective academic, social and financial support services for students and moving away from teacher centred learning models.

Recommendations for higher education institutions

- *Develop a stronger student-centred approach in teaching activities, building on the international best practice and the existing models in Lombardy.* Reduce the number of contact hours. Engage employers in the curriculum development, invite professors from industry and encourage employment after the 1st cycle. Adopt new forms of education that are interactive, and tailored to the individual needs and capacities of students. They involve inter-disciplinary learning, work-based and problem-based learning methods, and programmes to develop employability, entrepreneurial and transferable skills. Transferable skills should be embedded in degrees programmes across the academic disciplines to boost the productivity base of the region and enhance its internationalisation efforts.
- *Address the need for lifelong learning and more flexible modes of delivery for those who combine work and study.* Steps to make part-time learning more available should be a top priority among the universities. The lifelong learning measures should include transparent pathways to higher education, the ability to attend multiple institutions, obtain short-term education and training that can be recognised towards degrees, and re-skilling and up-skilling courses and programmes designed to the needs of working adults. This involves recognition of prior learning and experience, course and programme articulation agreements, clear and enforceable policies, and collaborative programmes between higher education institutions.
- *Address the needs of a diverse student population and link this with the construction of flexible learning pathways that include type B tertiary education.* Facilitate mobility between a Laurea degree and vocational higher education; ensure credit transfer, and recognition of skills and competencies. Provide information and tutoring to facilitate the process.
- *Look to match global levels of excellence in supporting entrepreneurship in the curriculum,* and build comprehensive support programmes encompassing entrepreneurship training, practical experience of creating new businesses for groups of students, and incubation and hatchery facilities together with seed funds for new graduate ventures.
- *Foster best practices from the international higher education system to boost comprehensive internationalisation policy in collaboration with regional stakeholders.* This would include not only exchange of students and staff, but also global international and intercultural dimension in universities' teaching, research and public services, as well as efforts to help attract talent and foreign direct investment in the region, and link local companies with global networks.

Research, development and innovation in Lombardy

Lombardy has a large concentration of Italy's R&D activity and is home to more than 22% of Italy's research staff. Universities in Lombardy have gradually improved and extended their research activities but many imbalances persist in the innovation system. Although improved, university-industry relations remain mainly fragmented and underdeveloped compared to the leading regions in the EU and major competitors abroad.

Italian R&D activity is concentrated in Lombardy, which boasts 15 universities and around 220 000 students. Almost 9 000 students earn a degree in technical and scientific subjects every year, with a range of more than 60 specialisations. Approximately 30% of private sector researchers and 22.2% of the total number of researchers in Italy are located in Lombardy. The share of business R&D is the highest in Italy after Piedmont. Lombardy universities have made significant progress in knowledge production and publication notably in life sciences (*e.g.* University of Milan and Vita-Salute San Raffaele University) and engineering (*e.g.* Politecnico di Milano) and are now approaching most advanced universities in the OECD area. The volume of higher education research is significant and its quality generally recognised.

The Regional Innovation System has been strengthened in the recent period. Patenting activities have strongly developed and the number of patent registered is by far the highest in the country (the number of European patents conceded by the EPO to the province of Milan has already reached 37% of the Italian total). A number of intermediate organisations have been established to forge links between firms and research organisations. In certain cases, for example, in the life sciences, they have led to the creation of consortium and technology transfer centres. In general, the focus of intermediate organisations seems more on promoting training than supporting collaborative research project.

While the regional innovation system performs relatively well at the R&D stage, knowledge diffusion remains a challenge. Most universities are now endowed with technology transfer offices, but these TTOs remain understaffed and often lack proactive strategies. On the whole, co-operation between higher education institutions and small business remains poorly developed with some notable exceptions.

Lombardy's industrial districts represent a key feature of the production framework but they need to improve their innovation capacities in order to face competition from new emerging economies. This will require a shift from firm-based interactions to broader networks comprising universities, research centres and financial institutions. National policy initiatives support this transformation but in a fragmented manner. While transfer of university research results to the market has improved, the TTOs remain outside of articulated networks with firms and public research centres.

The regional government has taken steps to launch an industrial district policy in collaboration with the national government. Its strategic plan targets knowledge-intensive and conception-intensive activities. However, this approach remains mainly traditional; in the field of design, no attention is devoted to the capacity of universities to sell education services in international markets.

The Regional Development Plan (*Programma Regionale di Sviluppo*) has a focus towards industries with a high R&D content but a limited emphasis on the non high tech sectors in which Lombardy already has a comparative advantage. In these sectors, universities could be mobilised not only to train more students but also to increase their R&D efforts.

In general, there is a need for a more proactive policy involving greater higher education teaching and R&D efforts by both national and regional governments. This is due to the fact that the region continues to have a low level of educational attainment; for example, in 2008, among 265 European regions Lombardy ranked 221 in terms of the educational attainment of the 25-64 year age group.

Internationalisation of higher education is an important component of national and regional education policies. The continuing loss of a substantial number of graduates and post-graduates constitutes a threat to the long-term competitiveness of the region and the region should make greater efforts in attracting international talent and retaining graduates of its higher education system.

The weak interaction between the higher education sector and the business sector is another issue that needs consideration. In Italy and Lombardy, the absorption capability of the business sector with regard to hiring tertiary education graduates is limited. Per thousand employees the number of business enterprise R&D personnel is lower in Italy than in the most advanced EU countries. The focus on collaborative research remains

insufficient. Supplementary funding from the public authorities would be welcome in particular through joint initiatives of several regions.

In the 2000s, efforts have been made to strengthen the links between universities and science parks and to create technology transfer offices. These new infrastructures have delivered positive results. There is an increasing trend in university patenting. The number of spin-offs linked with university research has grown dramatically albeit from very low levels at the beginning of the decade. While Lombardy ranks first in Italy for the number of venture capital deals, many venture capital funds find it less risky to invest abroad than in the region. Apart from the Politecnico di Milano, universities are also less active in providing services to firms. In that context, co-operation between universities is at early stages of development. There is also a need to integrate the university technology transfer offices in entrepreneurship teaching and development strategies.

The following measures would promote a regional innovation system in Lombardy:

Recommendations for the national policy

- *Incentivise universities to consolidate and professionalise their technology transfer offices (TTO).* It is important that TTOs operate within the framework of broadly defined strategies. Their role should not be reduced to a narrow interpretation of technology transfer but they could develop a “forum function” for SMEs and act as brokers or animators of high tech clusters. Ministries of education can help to promote such a strategic shift by sponsoring debates, reviews and reports on these issues.

Recommendations for the regional government

- *Foster a stronger alignment of education and research programmes with the regional needs.* In addition to elevating the technological level of districts and accelerating the transition towards meta-districts for several high tech sectors, focus should also be on the labour-intensive sectors. The Regional Development Plan should prioritise technologies and innovation in the field of the tourism, distribution, transport and green industries. Subsequently, there is a need to increase the grants for R&D programmes developed by universities in these sectors, which so far have received limited attention. The regional sustainability plan should be strengthened and better articulated, and the budget for university R&D clearly earmarked in those segments.
- *Take steps to enhance the contribution of universities and other tertiary education institutions to the full exploitation of the region’s comparative*

advantages, such as design. Lombardy design sector's competitiveness is internationally recognised. Public policies need to establish a better regulatory environment for the fashion and design clusters and more generally for the creative industries. There is also a need to promote and sell abroad design training. Ministries and departments of education at different government levels should promote the establishment of a consortium of Lombardy's tertiary education institutions to launch collaborative programmes on the international education market using the extensive knowledge and experiences accumulated in Lombardy.

- *Expand partnerships with neighbouring Italian regions in fields of interest for the higher education sector.* This is an area that has been relatively overlooked by the regional authorities. This co-operation should be furthered in order to: *i)* ensure a co-ordinated development of regional networks for industrial research and of research clusters of excellence; *ii)* promote exchange of methodologies, instruments and strategies for project evaluation; and *iii)* share modalities that enable comparison of initiatives of technology transfer and venture capital programmes. Joint R&D programmes should be initiated. This development could be facilitated by the delegation of powers to the region in the innovation domain. Envisaged budget cuts by the central government for education and research will risk interregional initiatives.

Recommendations for higher education institutions

- *Develop regional knowledge transfer model that is based on an ongoing relationship with industry:* While the university technology transfer models may lead to saleable intellectual property and start-ups, they seldom produce enterprises that grow in the region and contribute to regional economic development. Lombardy's localised supply networks are therefore critical to the process through which innovation is transferred to enterprises, and to create new innovation and transform and upgrade existing industries. The development of a well-functioning regional knowledge transfer model requires an ongoing relationship with industry to determine what innovations have the best opportunities for adoption and commercialisation, and the creation of an industry-university learning environment. It requires support for the human capital development required to adopt and apply process and product innovations, and collaboration with SMEs as well as large corporations. It measures success in terms of the sustainability and transformation of regional industry and employment growth.
- *Engage more actively in the diffusion of best practice in entrepreneurship support and education.* Given the increasingly strong

competition on the international market, universities need to develop a capacity to train a new generation of entrepreneurs with upgraded skills to support the development of industrial districts and high tech firms. Ministries of education at the national and regional levels could initiate programmes to train the trainers, and mobilise university staff and technology transfer offices for the supply of entrepreneurship teaching packages.

Creative industries, environmental and urban development

The creative sector of the Lombardy economy is one of the largest in Europe and in the world. It is a significant regional asset, with particular strengths in visual arts and design. Lombardy's educational and creative arts institutions attract talent from all over the world and should be acknowledged as a major industry.

The Lombardy region is an acknowledged centre of cultural and creative industries (CCI) in Europe, with particular strengths in industrial and fashion design, and architecture. Lombardy is ranked third among the top 25 European regions with important “clusters” of cultural and creative industries. Its art sector is important not only for the production and commercial distribution of art works, but also for its major art schools.

The creative portion of the SME base has been important to the global branding of the Lombardy's regional economy as a creative centre, but remains uncoordinated. Creative workers are a strong asset because of their contribution to continuous innovation improving the quality of life in the region and their internationalising influence through global connections. The Lombardy creative workforce is largely employed in very small enterprises or self-employed (30%). The sector features a lack of co-ordination among the creative enterprises compared to other SME sectors such as manufacturing.

There is a large and prominent non-university higher education sector, with 15 arts and music institutions and major private design schools in Milan. The creative design and arts sectors are less integrated in the network of higher education institutions in Lombardy, in part because professional training takes place in private specialised institutions. These schools are specialised and distinguished by an individual identity and “brand”, based on the prominence of their faculty and the type and style of training they provide. They attract international students and should be recognised for their important role as an export “industry”.

The creative educational institutions are important exporters in the regional economy. At the same time, studies of the sustainability in creative enterprises indicate that they frequently lack managerial skills required to develop sustainable businesses. Some of Lombardy institutions are taking steps to provide this kind of training but there is scope for substantial expansion given the importance of creative fields in the region.

Milan has lagged other creative industrial capitals in investing in the urban development planning and infrastructure that can both make the city more attractive and more productive logistically. Universities can play a more prominent role in urban regeneration and development, and addressing the logistic challenges of the region. Collaborative efforts are needed to improve the situation.

Milan has lagged behind other creative industrial capitals in investing in the urban development planning and infrastructure that can both make the city more attractive and more productive logistically. Plans, such as that for the exhibition complex at Rho-Pero are central to the transformation of Lombardy from an economy based in heavy industry to one that emphasises knowledge-intensive industries and services. There are also plans to invest in regional transportation infrastructure to link major urban centres in Lombardy – Brescia, Bergamo, and Milan. These investments are critical to improving the access of Lombardy firms to European and global markets. In addition to these regional investments, there is a need for urban redevelopment plans to foster the image of regional cities as creative hubs and centres for knowledge-based industry. The universities in Lombardy can play a more prominent role in this process, as evidenced by the University of Milan-Bicocca, which has transformed an old industrial area to a centre of education. Lombardy could examine the experiences of 22@Barcelona, which has developed into a multi-functional urban area, based on the idea of creativity, social cohesion and economic development. 22@Barcelona also includes an “urban lab” for pilot studies in greening the urban environment.

There are major university research programmes in Lombardy aimed at addressing the logistics and freight transport problems facing the region and its industries. The University of Bergamo has a wide range of initiatives focused on regional development with particular reference to productive systems, transport, internationalisation and exploitation of cultural and historical resources. A research centre with on-going programmes in this arena critical to the regional economy is the Centre for Research on

Regional Economics, Transport and Tourism (CERTeT) of the Bocconi University. Other centres contributing to urban development are the Centre for Research on Territorial Development of the Carlo Cattaneo University – LIUC and the Centre of Research on the Internationalisation of the Local Economies (CRIEL) of the University of Insubria. Co-operation among these programmes would strengthen their ability to influence an urban development agenda that improves the efficiency of the region through better transport planning but also build on the region's brand as an urban development knowledge centre with expertise in creative industries and historic preservation.

Lombardy has a worldwide reputation for its food culture and university expertise in agrifood sector. The forthcoming Expo 2015 will draw from the university expertise and will emphasise the theme of bio-diversity, connecting the food theme with environmental sustainability. The broad university agenda to build a global brand around Lombardy food expertise could be extended to value-added strategies for existing food industry SMEs in order to foster technological innovation.

Lombardy's universities are actively participating in a regional initiative to mount an international exposition – the Expo 2015 – organised around food. Lombardy has a worldwide reputation for its food culture but the Expo 2015 aims to have a strong scientific dimension, building on the region's less well known expertise in food science and the agricultural sciences. The Expo 2015 will particularly emphasise the theme of bio-diversity, thus connecting the food theme to broader concerns for environmental sustainability. The event will market Lombardy's strengths in bio-science, agriculture and food processing, and will reinforce the importance that urban development planning plays in sustaining the region's long-term competitiveness. The experience in joint planning for a flagship event should be capitalised and built on to forge further collaboration between universities and key public and private stakeholders.

Lombardy universities have developed an ambitious agenda to build a global brand around Lombardy food expertise. This agenda, incorporating both science-based initiatives and cultural programmes, takes advantage of the region's broad expertise and international food reputation but also its special experience in co-ordinating international expositions and events. Universities could extend this agenda to incorporate value-added strategies for existing food industry SMEs, in order to foster technological innovation.

The following measures would enhance the creative industries, environmental development and urban development in Lombardy:

Recommendations for the regional government

- *In collaboration with educational institutions, build a global brand for Milan as a centre of design education with the aim to create a strong export industry. This would involve encouraging collaboration with universities and non-university higher education institutions to develop the knowledge base in the regional economy and attracting young creative workers and students to the region.*
- *In collaboration with universities, build a global brand around Lombardy food “expertise”. The plan for Expo 2015 should showcase Lombardy’s existing strengths in the broadly defined food industries but also to bring new technologies into the regional SME sector. This should be extended to incorporate value-added strategies for existing food industry SMEs in order to foster technological innovation.*
- *In collaboration with the university expertise, resolve congestion and circulation problems in Milan, making urban districts more accessible and visible to visitors.*

Recommendations for higher education institutions

- *Contribute to the social and cultural inclusion of the diverse immigrant population through the university arts and humanities outreach activities, and programmes that include creative immigrant contributions.*
- *Develop interdisciplinary university programmes to provide a better knowledge base in the Lombardy creative economy. Universities could play an important role by jointly sponsoring an observatory on the creative sector and establish a dialogue between art, architecture and design through joint education programmes.*
- *Contribute to the development of the regional creative economy by developing and expanding programmes in entrepreneurship and non-profit management, both in formal degree programmes and through outreach efforts.*
- *Develop university technology transfer programmes to focus on the potential for development of productivity enhancing product and process innovations in creative fields in the region, particularly industrial design.*

- *In collaboration with the regional government, encourage and help plan urban investments that will enhance the region's image as a creative economy.*
- *Undertake both individual and collaborative initiatives to foster university demonstration of green building practices, including retrofitting of old buildings.*

Capacity building for regional development

Institutional autonomy of universities is a necessary pre-condition for stronger accountability. The new university law has the capacity to unleash the potential of universities for local and regional development and industry collaboration. But the right incentives and accountability schemes need to be in place to guarantee greater engagement of universities with industry, labour market and regional development in general.

International experience shows that reforming university governance and funding can contribute to a better performance of the higher education system. If universities are to be held responsible for their results, they must be free to decide how to use their human, financial and physical resources. Making universities both more autonomous and more accountable can enhance their performance. Better management of human resources, including merit-based career progression and improved recruitment processes, are key elements of higher performing institutions.

Italian universities have traditionally featured a lack of autonomy in the key areas of staff and funding decisions, which has limited the development of a more efficient university sector. The 2010 law on university reform enhances institutional autonomy and accountability by improved monitoring of performance and linking rewards to performance. It also promotes the separation of academic and administrative management of the institutions. It will be important that the forthcoming secondary legislation translate these principles into operational rules, and that regulation is then effectively implemented. At the regional level, the Lombardy universities need to take measures to ensure that new university statutes will strike the right balance between autonomy and accountability.

The new university law has the capacity to unleash the potential of universities for local and regional development and industry collaboration,

but special incentives need to be introduced to support this goal. Presently, there is a lack of national, regional and institutional policies, and incentive structures to support the regional and local engagement of universities, and their faculty and staff. In Lombardy, the recruitment, and promotion of the university staff are nearly exclusively determined by research performance, measured primarily by publications. Management and leadership functions are poorly rewarded and the “third mission” activities have been traditionally absent from the list of factors that have an impact on faculty career development. To make progress in regional development, universities need to introduce their own policies and mechanisms to enhance, recognise and reward faculty contributions to regional engagement. The University Rovira i Virgili in Tarragona, Spain, provides an example how university leadership can provide incentives for regional engagement.

Italy devotes fewer financial resources to tertiary education than other countries. Public funding is under increasing pressures, which calls for a sustainable financial plan with stronger private sector funding and cost sharing. Lombardy could also consider introducing competitive funds to stimulate cross-institutional and interdisciplinary challenge-driven research and educational programmes that are aligned with the region’s needs.

Italy devotes fewer financial resources to tertiary education than other OECD countries, whether in terms of annual expenditure per student (37% less than OECD average, including public and private expenditure in 2007), a share of GDP (0.75% versus an OECD average of 1.2%) or a share of public expenditure (1.6% and 3.0%, respectively). At the same time, Italy devotes less private funding to higher education than OECD countries in general. Public funding for higher education is under increasing pressures in Italy, endangering the ability of the universities to improve their performance and to take full advantage of the university reform.

Any attempt to increase efficiency in university education is a substantial challenge unless it is backed by a sustainable financial plan reflecting a long-term commitment on the part of the state. A two-pronged strategy could be articulated and implemented to achieve a sustainable financial plan for higher education: *i)* increase private financing and cost-sharing in higher education to improve performance and efficiency; and *ii)* increase resource diversification in higher education institutions.

Progress on the higher education front requires a long-term commitment to finance it on the basis of clear criteria aligning needs, performance and resources in an objective and transparent manner. Currently, the university state funding has a small, albeit increasing performance-based element. There is scope to strengthen the performance-based funding to achieve policy objectives, increase efficiency, improve accountability, and encourage a greater degree of institutional innovation and specialisation. Stronger performance-based funding would also encourage greater transparency in how resources are utilised by directly relating inputs to outputs.

At the regional level in Lombardy, introducing competitive funding could fulfil many objectives including the improvement of quality and efficiency of the universities, and stimulating cross-institutional interdisciplinary challenge-driven research and educational programmes that are aligned with the region's needs. On the long-term, performance-based funding of universities would provide the regional government with the means to ensure that the required institutional behaviour is encouraged.

Furthermore, a variety of funding mechanisms can be used to provide incentives for regional engagement of higher education institutions, for example: *i)* Formulae for block grant funding could include higher weights for enrolment from special populations such as students from low socio-economic and/or immigrant backgrounds or for enrolments in academic programmes related to regional labour market needs; *ii)* Policies governing financial aid to students can provide higher amounts for in-region students and special populations; *iii)* Eligibility for special or "categorical" funding could be contingent on evidence of regional engagement and focus; *iv)* Eligibility for funding could include requirements that institutions collaborate. This could provide incentives for higher education institutions to facilitate mobility of students (credit transfer within the region) and share programmes and other resources in efforts to serve the region; and *v)* Provision of matched funding schemes could encourage higher education institutions to engage with regional employers in education and training services.

The development of the quality assurance system is key to helping higher education institutions in Lombardy improve their teaching, research and public service functions in order to become an internationally competitive higher education system.

National level quality assurance has been created to comply with the requirements of the Bologna process and the European Higher Education Area. The national evaluation agency ANVUR has the capacity to develop into an important instrument for degree accreditation as well as working with universities in enhancing their performance and quality.

If Lombardy wishes to strengthen its position in the global market, it could explore the feasibility of establishing a region-wide independent quality assurance organisation or agency in co-ordination with the national agency to which all higher education institutions could be invited to participate on a voluntary basis. An independent agency should place great importance to the learning and employment performance of graduates and could establish accreditation criteria competitive at the international level. It would be important to emphasise the need for flexibility and diversity in the higher education system. By doing this, higher education institutions would benefit from the evaluation of their academic programmes and from collaborating with graduates, employers and the local region.

The experience of other OECD countries suggests that criteria emphasising regional engagement and responsiveness can be included in programme review and approval. In the case of Lombardy, these regional criteria could include: *i*) Data documenting the specific gaps in access and opportunity for the population and important sub-groups (*e.g.* students from low socio-economic background); *ii*) Data documenting relevant regional labour market needs and potential future needs arising from regional development plans; *iii*) Evidence of the engagement of regional stakeholders (employers, community representatives and representatives of under-served population groups) in programme planning and design; and *iv*) Emphasis on regional engagement (*e.g.* internships, community service, student research on regional issues) within the curricula and student experience.

The Regional Government of Lombardy has requested additional competencies from the Italian state in universities, research and innovation. With the new competencies the regional government seeks to transfer resources for university funding to the region and establish a regional university system with greater autonomy concerning regionally relevant R&D and education.

University education in Italy is governed through complex legislative and policy agenda at the national level. The legislative power, remit and responsibilities regarding education are divided between the Italian state and

regions. The state has the responsibility for the general provision of education. The Regional Government of Lombardy is currently responsible for the provision of student services and financial support for new degree programmes or university buildings. Furthermore, the region is also responsible for vocational education, in particular in terms of creating an integrated system of education and professional training.

The Regional Government of Lombardy has requested additional competencies from the Italian state in universities, research and innovation. With the new competencies the regional government seeks to establish a regional university system with greater autonomy concerning the provision of degree courses with specific regional focus and to transfer resources for university funding to the region. This would provide an opportunity for the region's universities to become more active players in regional development.

In order to prepare for the new competencies it is necessary to develop a strategic plan and vision for the region, backed up with an implementation plan involving all universities, as well as funding, and develop an embedded accountability system.

Lombardy's Regional Development Plan (*Programma Regionale di Sviluppo*) has a strong focus on knowledge society, sustainability and demographic change, and has engaged universities in the development and implementation phase. A number of collaborative bodies and initiatives have been launched, including the Strategic Agreement for Regional Development; but there is currently no overarching plan that integrates the efforts and assesses the results. In order to ensure return on public investment, there is a need for better co-ordination between the strategic plans and their implementation. System diversity in terms of the types of higher education institutions, study programmes and modes of delivery is necessary to ensure that the higher education system has the capacity to meet the challenges of knowledge society. Greater system diversity and responsiveness to regional needs would require mission diversification of universities and strengthening the vocational tertiary education.

The Lombardy higher education system is principally a university system; there is some diversity of mission, but the overwhelming emphasis is on classical academic provision. Despite the presence of some of the most specialised institutions in the country, the university sector features insufficient differentiation in terms of degree programme offer both regionally and generally, with overlap and repetition among the universities. The focus on the university sector means that it operates at a distance from the rest of the higher education, for example, the vocational higher education institutions and AFAM institutions.

The development of a knowledge-based economy requires a diverse set of skills and competencies. Vocational education has an important role in not only fostering those skills but also for widening access to higher education. Type B tertiary education is therefore important to build capacity at regional level. Lombardy is well placed to address this challenge, as it has fostered the development of centres for higher professional and technical training/education (*Poli formativi*), which could provide a basis for further development.

The following measures would promote regional capacity building:

Recommendations for the national policy

- *Make regional engagement and its wide agenda for economic, social and cultural development explicit in higher education legislation and policy. Provide incentives for higher education institutions' regional engagement in the form of strategic incentive-based funding schemes on a competitive basis.*
- *Strengthen higher education institutions' accountability to society by developing indicators and monitoring outcomes to assess the impact of the higher education institutions on regional performance. Include the contribution of higher education institutions to local and regional development in their annual evaluations.*
- *Move from an ex ante bureaucratic process of accreditation of degrees into one of a periodical evaluation of institutions and programmes in the framework of the European Standards and Guidelines. Most important: internationalise the evaluation process. An international evaluation of higher education institutions in Lombardy with the aim of supporting innovative governance and management is recommended.*

Recommendations for the regional government

- *Build an integrated vision of the Lombardy higher education system. The most important goal of the regional government's agenda is the decentralisation of competencies relative to universities, innovation and research. A strategic plan and capacity building is of utmost importance to enable the regional government to strengthen its request to have greater autonomy in higher education and to be in a position to take full advantage of these special powers.*

- *Develop a common vision of local and regional development among higher education institutions, by building on existing links and initiatives that align higher education institutions with the regional needs.* Support the vision with a strategy and milestones, and funding in order to ensure that local engagement is part of higher education institutions' activities and reflected in their development plans.
- *Develop and encourage collaboration between regional stakeholders and higher education institutions in order to foster economic and social wellbeing in the region.* Promote collaboration between the organisations, bodies and units already in existence, clarify their tasks and remit, and strengthen their accountability to the public.
- *Invest jointly with higher education institutions in programmes that bring benefit to regional businesses and community, for example, translational research facilities that are aligned with the needs and opportunities of the region, advisory services for SMEs, professional development programmes, graduate retention and talent attraction programmes.* Consider using competitive funding to stimulate cross-institutional, multidisciplinary R&D and education programmes which are aligned with the regional needs. Consider introducing a region-wide independent quality assurance organisation or agency in co-ordination with the national agency and invite all higher education institutions to participate in it on a voluntary basis.

Recommendations for the universities

- *Take full advantage of the new university law and the subsequent governance change.* It is important that the new university statutes strike the right balance between autonomy and accountability and are well formulated to accommodate this complexity.
- *Make promotions based on merit only.* Inverted age pyramid for university teaching staff enables human resource planning. Review staff recruitment, hiring and reward systems so as to include the regional development agenda. Create mechanisms to monitor and evaluate the activities in this area, to share good practice between the institutions and benchmark this experience with other organisations and localities.
- *Prioritise regional and local development by developing the senior management teams to deliver corporate response expected by regional and local stakeholders without disincentivising entrepreneurial academics.* The universities in Lombardy should attach a top priority to the region-wide socio-economic development and engagement by

making the rector or pro-rector (who is reporting directly to the head of the institution) responsible for this task. A professional management structure should be put in place to support this task. Along with science and technology transfer, stronger focus should be given to a broad range of regional and local development such as human capital development as well as social, cultural and environmental development. Incentives should be created to encourage university faculty and staff engagement.

- *Collaborate to rationalise the degree programme offer.* The universities in Lombardy should develop ways to rationalise their offer of degree programmes and to develop joint degree programmes at Masters and PhD level.

OECD reviews of higher education in regional and city development

Universities and other higher education institutions can play a key role in human capital development and innovation systems in their cities and regions. In the context of global economic and financial crisis, OECD countries are seeking to mobilise higher education institutions (HEIs) to support more strongly their economic, social and cultural development.

In 2008, the OECD/IMHE launched a second series of OECD Reviews of Higher Education in Regional and City Development to address the demand by national and regional governments for more responsive and proactive higher education institutions. As a result, 14 regions in 11 countries have undergone the OECD review process in 2008-11.

This OECD Review of Higher Education in Regional Development of the Lombardy in Italy (www.oecd.org/dataoecd/55/57/49001152.pdf) explores a range of policy measures and institutional reforms to mobilise higher education for the development of the region. It is part of the series of the OECD reviews of Higher Education in Regional and City Development. The reviews analyse how the higher education system impacts local and regional development and help how this impact can be improved. In addition to human capital and skills development, technology transfer and business innovation, the reviews also considers higher education's contribution to social, cultural and environmental development and regional capacity building.

To know more about the OECD review process and requirements, visit Higher Education and Regions' website at

www.oecd.org/edu/imhe/regionaldevelopment.