

OECD Review of Higher Education in Regional and
City Development

Andalusia, Spain



Assessment and recommendations

Andalusia: moving from low-skills towards a knowledge-based region

Andalusia is the most populous region in Spain with over 8 million inhabitants, representing 18% of the population in the country. Historically a crossroads of three cultures – Christians, Muslims and Jewish – it has enjoyed remarkable growth and improvement in living conditions. Since the accession of Spain to the European Union in 1986, Andalusia has also successfully transformed itself from a traditional region of emigration into a host region for new immigrants. Despite the progress made, the region lags behind the Spanish and EU averages in key socio-economic indicators, currently standing at 80% of the EU average GDP per capita.

The current economic and financial crisis has affected Andalusia harder than most other Spanish regions due to its economic structure that is over-dependent on construction and tourism and is lagging behind in industrial diversification. From April 2008 to October 2009 the regional GNP contracted by 4.5% and the unemployment rate reached 26.3% after destroying 28 700 jobs. The negative development has continued so that in the second quarter of 2010 the unemployment rate stood at 27.7%, eight percentage points above the national average. The deterioration of the labour market situation has revealed the vulnerability of the regional labour market which is characterised by low skills.

In the two last decades educational attainment levels have improved in Andalusia: for working age adults in employment the years of education have increased by 3.9 years compared to 3.6 years nationally. Despite the improvements, disparities remain between Andalusia and Spain as a whole.

The Regional Government of Andalusia has had a strong leadership role in steering the region towards a knowledge-based economy through massive investments in innovation, human capital development and improved connectivity. The economic crisis and the fact that beyond 2013 Andalusia will no longer be eligible for receiving European structural funds as a convergence region will significantly reduce external funding for the region. This situation constitutes a real challenge for the region and its authorities but also an opportunity to build on the regional assets. In this context, the key challenges for Andalusia and its universities and other tertiary education institutions are the following:

- How to improve the overall educational attainment levels and improve the flexibility of the population to face rapid changes in the labour market? How to improve the relevance and quality of education?
- How to create jobs, promote new business formation and attract knowledge-based businesses (industry and services)?
- How to leverage the current economic base? How to strengthen and diversify the existing industries and improve the absorptive capacity of the SME-based economy?
- How to address the socio-economic gaps, needs of the diverse population and a growing number of ageing citizens?

A region that wants to be globally competitive needs to have a highly skilled workforce and knowledge-based economy that can absorb this workforce. In order to slash unemployment Andalusia needs to improve its overall educational attainment levels, improve the relevance of university education, widen access to tertiary education and improve the flexibility of the workforce by re-skilling and up-skilling. It also needs to diversify and upgrade its existing industry.

To address these challenges, Andalusia needs a comprehensive approach to human capital development including a human capital development strategy with vision, goals, milestones, co-ordination measures and robust evidence base. Employability, creating jobs and providing access to employment opportunities should be seen as the primary goals of innovation and human capital development. A more enabling environment needs to be created for new business formation and upgrading the current low skilled economy. A systematic approach should be adopted to entrepreneurship in education and a wider innovation concept should be adopted in order to move away from the science-push model. The good practice examples in the region in widening access to higher education and industry-university collaboration should be disseminated, extended and scaled up. University

funding system should be revisited to allow for stronger incentives for greater alignment with regional needs and inter-institutional collaboration.

Finally, Andalusia's geographical location, multi-cultural heritage with the co-existence of three cultures, connections with North Africa and the presence of migrants from this area constitute strong assets that the region could capitalise on in developing cultural tourism, attracting foreign direct investment, integrating migrant population and encouraging ethnic entrepreneurship.

Human capital development in Andalusia

Tertiary education in Spain and Andalusia has experienced strong growth and development over the past two decades. The regional distribution of universities ensures that geographical barriers to access university education have been largely removed. But long-term joint efforts are needed to overcome the challenges in the secondary education system which is characterised by high drop-out rates and poor learning outcomes. At the same time, widening participation and social inclusion should feature more prominently on the education policy agenda.

The Spanish tertiary education system has experienced significant growth and transformation over the last 20-25 years. In Andalusia since 1990, five new public universities have been established. The geographical expansion of the university system, now encompassing ten public universities, has improved access to higher education, by bringing university education to each of the eight provinces. The overwhelming majority of students come from Andalusia, with most students attending their local university: in 2009-10, only 7.2% of the first year students are from other regions in Spain, 0.68% from EU countries and 2.5% from the rest of the world. Universities in the smaller provinces remain strongly aligned with the local needs.

Challenges in tertiary education and economic development in Spain and Andalusia are partly linked to the problems in the secondary education system which features high drop-out rates and poor learning outcomes. A

significant proportion of the young age group remains outside education and training: nearly one in three Spaniards between the ages of 18 and 24 have not completed secondary education and are not enrolled in education or training, representing more than double the EU average (EU-27). Those in school perform poorly in international testing (PISA). Fewer than one in 20 of Spain's 15-year-olds reach the top levels of science proficiency. Only 1.5% of 15-year-olds in Spain belong to the top performers for reading, the lowest percentage in the OECD countries apart from Mexico. Among ten Spanish regions, Andalusia holds the lowest scores in PISA in science, reading and mathematics.

The primary responsibility for overcoming quality and equity gaps in secondary education lies with school authorities at the national and regional levels who will need to address the challenges in a comprehensive way and mobilise appropriate levels of financial resources to support education. Universities should, however, actively reach out to local schools to raise aspirations and academic performance of students and to improve the quality of teaching. In Andalusia, there was limited evidence of long-term institution-wide or system-wide collaboration between schools and universities.

While equity policies have improved in Spain, students' financial, academic and social support system is in need of strengthening. Participation in tertiary education is still related to socio-economic background. Widening participation and social inclusion should therefore feature more highly on the education and policy agenda in Spain and in Andalusia.

The Andalusian University System features long duration of studies, high dropout rates and poor graduate employment outcomes. There is a need to improve the alignment of education provision with labour market needs, improve university-industry linkages and track student progress and graduate employment outcomes.

The Andalusian University System demonstrates a low level of efficiency in graduate production. In 2006, the total number of university students was 223 501 whereas the total number of graduates was 29 776, only 13% of the total number of students. Due to the lack of adequate student support, there is limited mobility by Andalusian students and a significant number of students work while studying. As a consequence, there is also a high level of educational failure: the drop-out rate is estimated at 30% of students in Spanish and Andalusian universities. Students are also

taking longer than necessary to complete their degrees. The long duration of studies results in high costs to the society, late entry to the labour market and a low level of efficiency of the university system. It is in the public interest that the authorities take steps to ensure that the current educational reform will change this tendency.

A major challenge facing Andalusia is the high level of unemployment, reaching 28% in the second quarter of 2010 and exceeding the national average by eight percentage points. While unemployment hits harder those without a tertiary education degree, the labour market outcomes of the university graduates are poor and have deteriorated under the current economic crisis. High youth unemployment (40%) and poor graduate employment outcomes are challenges that the regional government and the university system need to address.

There is a lack of robust data about student progress, graduate performance, employment outcomes and graduate destinations. The ARGOS programme does not provide an adequate vision of graduate employment. Moreover the universities themselves need to establish an appropriate method of tracking graduates as a way of informing curriculum development and better understanding how education meets the needs of society and the economy.

There is considerable variation among the Andalusian universities in addressing the skill needs of the region. Traditionally, the design of study programmes has been supply-driven, based on the academic capacity within the universities. A rigorous analysis of the labour market demand has not yet been carried out. As a result, there is a degree of duplication of programmes which are not well-aligned with the regional socio-economic needs. To move away from traditional modes of teaching and learning and to better align educational programmes with regional needs, the universities should take full advantage of the ongoing pedagogical reform and engage academic staff, students and employers to support this reform.

Universities have established various forms of work-based learning opportunities and entrepreneurship training for students, but in general only a small proportion of students in a limited number of fields benefit from them. Creating stronger ties between students and regional employers through internships and co-operative programmes should be made a priority. To change the economic fabric of Andalusia, to enhance the relevance of education and to improve students' employment outcomes it is necessary to develop new types of programmes and active learning modes that integrate employability, industry linkages and entrepreneurship in all study programmes.

The high and rising levels of unemployment necessitate effective for lifelong learning provision. Currently, there is an abundance of providers in continuing education, with limited co-ordination resulting in overlapping provision and difficulties in monitoring the quality of the courses. There is limited data available to understand the needs of the adult population or the efficacy of higher education in meeting them. The regional government has sponsored new modes of learning by supporting innovative initiatives, such as the Digital University and Andalusian Virtual Campus, that facilitate distance and lifelong learning. These mechanisms should be mobilised to reach out to the unemployed population. Other approaches that have demonstrated effectiveness with adults, such as work-based programmes targeted at adults and dual study programmes that combine work and study, could also be considered.

Andalusia is one of the leading Spanish regions in university spin-offs but the new businesses are often not growth-oriented or successful in the real job market, generating only few jobs and small turnover.

Andalusia is one of the leading Spanish regions in university spin-offs and much of the entrepreneurship support is channelled through incubation centres. There are a large number of activities, initiatives and projects developed by universities and the regional government to support graduate entrepreneurship. However, while the universities have a good track record in spinning out companies, in general these are not growth-oriented or successful in the real job market, but continue to be supported by public funding. The number of jobs created and the turnover remain low.

Entrepreneurial activities and entrepreneurship education are in an early phase of development and mainly technologically oriented. This is reflected in the limited breadth and refinement of entrepreneurship education activities in the universities and the small proportion of students benefiting from them. Collaborative mechanisms between the universities to boost innovation, business incubation and development remain limited. Andalusia would benefit from concerted efforts to support entrepreneurship activities and share good practices among universities, business and government to pool resources and gain critical mass. Furthermore, university programmes in business development and incubation should be extended and tied more closely to regional efforts, such as those being undertaken by regional development agencies.

Andalusia is among the most attractive regions for international students in Spain. The regional government has recognised the need for capacity building for internationalisation. There is considerable potential in internationalisation through better integration of international students and nurturing talent within the existing migrant community.

The number of international students is on the increase and in the national comparison Andalusia is one of the most attractive regions in Spain. In 2010-11, there are 6 158 international students making up 2.6% of the Andalusian student population with the universities of Malaga and Granada leading the scene (4.8% and 3.2% of their total student enrolment respectively). A more effective joint marketing of the Andalusian University System could attract more talent to the region and enhance the visibility and impact of the Andalusian University System.

There is potential in internationalisation through stronger integration of international students in academic and student life, and a lack of initiatives to link international students with employers in Andalusia or to mobilise them as ambassadors for Andalusia. The University of Granada has taken steps to address these issues by connecting international students with local employers and participation in language learning efforts (for example Arabic) sponsored by the regional government. These efforts should be scaled up and adopted throughout the university system.

The Regional Government of Andalusia is aware of the need to build capacity in internationalisation and improve language competencies. It has introduced the Talentia Programme to train globally-minded talent for the region. This programme would benefit from closer connections with the employers and alignment with the regional development needs to guarantee return on public investment. The recently introduced talent attraction programme has had a slow start and would benefit from a focus on attracting people with a proven track record on industry-university linkages and growth-oriented business creation. There is also a need to nurture and draw on the skills and competencies of the current migrant population in the region. For example, the diverse migrant community includes a highly qualified segment of immigrant retirees whose competencies could be mobilised to contribute to teaching, research and entrepreneurship education as well as Andalusian export efforts, for example in collaboration with the Trade Promotion Agency in Andalusia (EXTENDA).

Immigration has contributed to a population growth in Andalusia and has been a key driver of economic growth in recent years. Actions need to be taken quickly to keep and reintegrate immigrants in the workforce and educational system.

Andalusia, like the rest of Spain, has a drop in birth rates that is partly compensated by immigration. The net contribution of immigration to population growth during the last ten years approaches 600 000 inhabitants. 23% of the foreign population come from Africa, 19% from South America and 15% for the EU-15.

Unemployment among the foreign-born labour force has increased in all OECD countries, the rate of Spain being 28.3% which is over 11 percentage points higher than the unemployment rate of the native-born labour force. Immigrant youths have suffered disproportionately during the crisis and the comparison with native-born youth, who suffered more than prime-age adults, is significant.

No robust data were available in Andalusia about education participation levels among the new immigrant community either at the system or institutional level. There is a need to strengthen the knowledge base about overall training needs and improve access to tertiary education among the immigrant community. Useful analysis in this area could be carried out with the contribution of all universities to help develop region-wide programmes to raise aspirations among immigrant children and to provide re-skilling and up-skilling opportunities. The University of Almeria has taken steps to address the needs of the immigrant population by designing a small scale programme “Join us in your university” (*Programme ÚNETE a tu universidad*) which raises aspirations among secondary school students with migrant backgrounds and operates in close collaboration with the local schools.

Integrating immigrants into education and labour market systems is an important challenge in Andalusia. International experience in integrating both highly skilled as well as those with low skills into education and the labour market can be found for example in Malmö, Sweden. Examples of successful reintegration of foreign employees into the work force come from Japan, where active outreach and targeted training services have been used.

The Regional Government of Andalusia has created a regional university system which is characterised by collaboration and co-

ordination. The university funding model provides a powerful steering mechanism that could be used to encourage stronger alignment of educational programmes with regional needs. Andalusia would also benefit from a more comprehensive human capital development system stretching from secondary education to tertiary education and lifelong learning.

Reducing the complexity of the university decision making system in Spain is advisable in order to improve efficiency and transparency in education. Strengthening universities' institutional autonomy is important but not a sufficient precondition to ensure greater engagement of universities with the labour market and regional development if the right incentives and accountability schemes are not in place to support such activity. Mechanisms need to be put in place to monitor the return on investment and the results achieved.

The Regional Government of Andalusia has created a regional university system which is characterised by collaboration and co-ordination that manifest themselves in many areas, for example a common university curriculum for 75% of undergraduate education, regional quality assurance for higher education and research, and a funding model that has introduced a mix of performance-based allocation elements linked to both policy objectives and to institutional performance as a lever to increase efficiency and improve accountability.

There is currently limited diversity of mission within universities in Andalusia, leading to some overlap and duplication of efforts. A large proportion of common curricula may constrain stronger differentiation of universities in their course offerings and the alignment of study programmes with local needs, reducing the responsiveness of the university system. The regional government should ensure that the strong element of co-ordination does not stifle institutional initiatives aiming for specific niches or for a better alignment with local needs.

The university funding model in Andalusia, in which 30% of the funding is based on results, provides a strong tool for the regional government to steer the university system and to improve its accountability. In order to mobilise universities for regional development, the regional government could consider encouraging greater alignment of programmes with regional needs as well as institutional innovation and specialisation. It could also consider whether stronger incentives are needed to mobilise universities for regional engagement and collaboration between institutions.

This element could be integrated into the funding system through the launch of a competitive funding model for programmes that are needed in the region and its labour market. Competitive funds could fulfil many objectives, including the improvement of quality, relevance and efficiency of the universities.

The tertiary education sector in Andalusia is principally a university system; there are limited pathways and interaction with vocational higher education and secondary education. A well-developed mechanism for accreditation and recognition of prior learning could provide a more flexible system by which learners could take up different learning opportunities at different stages of their lives. Examples in this domain come from Ireland and Sweden.

Andalusia would benefit from a comprehensive human capital development system stretching from secondary education to tertiary education and lifelong learning. The Regional Government of Andalusia could build stronger relationships among the different components of the education sector – universities, vocational higher education institutions and secondary education, so that they operate as an integrated developer of human capital potential.

There is a need for a stronger regional policy for human capital development. 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 tertiary education institutions with multiple, complementary missions aligned with regional needs, and *iv)* revision of student selection, finance policy (institutional, regional and national student support), and governance/regulation. Specific data needs include: *i)* educational attainment benchmarked to country-level achievement and OECD average and the best performing OECD countries, *ii)* migration by educational level and age, *iii)* regional higher education participation rates (*e.g.* 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 tertiary education institutions as well as other levels of education.

The following measures would promote human capital development in Andalusia:

- A wider portfolio of robust data related to the regional context and the situation of individual higher education institutions – universities and vocational higher education institutions – should be developed in Andalusia to support evidence-based decision making

at the regional and institutional levels. 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 come together and increase students' chances of finding employment. Finally, the data should be used strategically to identify regional priorities and to respond to the data in terms of course offerings and the provision of employer/cluster-specified skills by educational institutions.

- The regional government should develop the existing funding model of the Andalusian University System to improve the accountability, specialisation and efficiency of the universities. The funding system could provide greater incentives for regional engagement of universities by introducing competitive funds and for example through the following measures: *i*) formulae for block grant funding could include higher weights for enrolment of students from special populations (students from lower socio-economic and/or migrant backgrounds) or for enrolments in academic programmes related to regional labour market needs, *ii*) eligibility for special or "categorical" funding could be contingent on evidence of regional engagement and focus, *iii*) requirements that institutions collaborate in order to obtain funding and *iv*) special funding could be established to provide matching of funding obtained by universities from contracts with regional employers for education and training services. The Regional Government of Andalusia could establish a special regional investment fund (funded from public and private resources) to support building university capacity for regional engagement and provide incentive funds to institutions and individual faculty members for regional initiatives. These could emphasise increasing tertiary education access for the region's target populations, engaging faculty members and students in teaching/learning and applied research projects related to regional priorities. To ensure return on public investment and stronger accountability, higher education institutions and regional government should improve their mechanisms for following-up and monitoring the success of their programmes.
- The regional government, tertiary education institutions, other educational institutions and key stakeholders of the economy and society should work together to establish a Regional Human Capital Development System embracing the education pathway from secondary (or even primary) to higher education and lifelong

learning in order to define region-wide goals, policies and priorities. Pathways between universities and vocational higher educational institutions and different levels of education should be strengthened. Measures should be put in place to accommodate and encourage mobility within and between educational institutions at different levels to enable students to move from one institution to another by co-ordinating and formulating formal agreements and a mechanism for recognition and accreditation of prior learning and experience.

- The regional government should strengthen its efforts to develop general competencies among the population to help adjustments to rapid changes in the labour market and to facilitate lifelong learning. Systematic joint efforts should be made by the authorities, educational institutions and key stakeholders to raise the levels of education attainment and re-skilling and up-skilling activities. Technical and vocational education should be strengthened for the benefit of the regional industry. The regional government and tertiary education institutions should prioritise lifelong learning and responding to regional demand. These steps should create clear and transparent pathways to advanced education for adults, including the ability to attend multiple institutions, obtain short-term education and training that can later be applied to degrees, and re-skilling and up-skilling courses and programmes designed around the particular needs and interests of adults who often combine work and study. Due to the high unemployment rates, it is important to develop a tailored curriculum for lifelong learning, to reinforce VET flexibility and improve ICT and entrepreneurship skills. Special emphasis should be given to the co-ordination between the programmes provided by vocational higher education institutions and those provided by the universities.
- The regional government, tertiary education institutions, schools and the business sector should develop long-term efforts to increase the access and success of the first generation students including those from socio-economic and/or migrant background. These efforts should build upon successful models of effective academic, social and financial support services for students, and moving away from teacher-centred learning models by taking advantage of the ongoing Bologna reform.
- The issue of affordability should be taken up in the national agenda in order not to price higher education attainment beyond the reach of students from low socio-economic backgrounds. The national government should develop the forms of cost sharing in higher education through means-tested scholarships, income contingent

loans or other funding packages to complement the existing loan and grant schemes. Both universities and the regional government should consider financial assistance to low income students.

- The regional government and universities should work together to increase their efforts to provide a stronger corporate brand for the Andalusian University System through joint marketing with the regional government. Stronger efforts should be made in internationalising the region, through enhanced language learning schemes, more focused talent attraction and development programmes, integration of international students in the academic and social life of their universities and cities by training them to become “ambassadors for Andalusia”. Inactive highly-skilled human capital of the immigrant retirees could be mobilised for the benefit of university research and teaching for example in languages, entrepreneurship and for the internationalisation efforts of the region.
- Universities and the regional government should work together 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, providing 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 an entrepreneurial and innovative mindset.

Innovation in Andalusia

The regional government is committed to making innovation a pillar of Andalusia’s economic development and placing universities in the heart of the regional innovation system. It has developed a full portfolio of policies, instruments and agencies to boost research, development, innovation and entrepreneurship. Faced with the economic crisis, the government needs to ensure that resources are not spread too thinly by focusing public funding around the most promising sectors, enhancing the existing assets of the regional economy and rationalising the number of intermediary organisations, agencies and programmes. Care

should also be taken that the strong public presence in the regional innovation system does not undercut its own goals of developing entrepreneurship.

The Regional Government of Andalusia is committed to making innovation a pillar of Andalusia's economic development and placing universities at the heart of the regional innovation system. It has excelled in areas of planning, co-ordination, analysis, goal setting, prioritisation and consensus building. It has a coherent plan with well-articulated long-term goals and has achieved good vertical and horizontal co-ordination of the national and regional plans to stimulate innovation and the knowledge economy through the Inter-Ministerial Commission on Science and Technology (CICYT).

The Regional Government of Andalusia has pioneered new agencies and organisational arrangements and created a dense network of innovation support institutions and intermediary organisations. It has increased mobility and connectivity in the region. It has also made important investments to engage the university system with regional development, which now plays a key role in the knowledge and innovation support system through policy design and is the main beneficiary of the public R&D funds.

The necessity to absorb large flows of funding, the fragmentation of the national and regional innovation system and the organisational disconnect within the regional government have resulted in many small scale, partly overlapping programmes, agencies and initiatives. The regional innovation system is dominated by the public sector while the contribution of business and industry is limited. As in the rest of Spain, the share of higher education research financed by the private sector has slightly declined compared to the mid-1990s. There are also imbalances between public and private spending in R&D and applied innovation. A large number of clusters have been identified with the aim to create technology centres in each, which indicates that decreasing funding may be spread too thinly instead of focusing on the most promising fields.

The regional government has facilitated the establishment of interface bodies to improve the knowledge flows between universities and industry and to boost demand for research and innovation in industry and small and medium-sized enterprises (SMEs). The large infrastructure of intermediary organisations shows a low co-ordination capacity and has resulted in relatively low outputs. There is a need to rationalise – reorganise and reduce – the number of intermediary organisations, agencies and programmes through mergers and improved networking capacities. In order to gain the critical mass, regional and national governments should increase their

support for networks and collaboration. This could facilitate the specialisation of universities and increase their capacity to commercialise research results nationally and internationally.

Strong government presence and publicly-driven innovation may undercut goals of developing entrepreneurship. The risk is that the ability to attract public funding for an idea becomes the measure of success, rather than the success in the market as a product people want to purchase and the amount of commercial return generated. Universities and the many public agencies supporting RDI in Andalusia tend to measure their success in terms of acquisition of external funding. A publicly-driven innovation system can also lead to the funding of initiatives and innovations which are not commercially viable without subsidies.

In order to mitigate or eliminate the potential disadvantages of publicly-driven innovations systems, the regional government could consider constructing efficiency/performance indicators for public agencies including universities involved in innovation. These indicators could include the time to process project applications, the cost to the provider (in time and resources) of applying to various public programmes and the administrative costs of the programmes. The indicators should be measured and benchmarked against a set of comparators that include good private sector actors as well as top public sector agencies. Finally, when the regional government creates programmes and instruments to substitute for the absent private sector, these should seek the highest levels of efficiency.

The Andalusian University System has made considerable progress in improving knowledge generation and R&D capabilities. However, the increase in academic publication is no guarantee that R&D is translated into innovation, and again into new products and processes that are tested in the market and eventually generate new jobs. Through long-term industry collaboration universities could move beyond their traditional role of knowledge producers and embrace a more robust concept of innovation.

The Andalusian University System has made considerable progress in improving knowledge generation and R&D capabilities. R&D assets are concentrated in the research-intensive universities. The number of research groups in universities has more than doubled over the last two decades

(1 746 in 2007 compared to 800 in 1989) leading to an increasing number of academic publications.

The number of patents and spin-offs from Andalusian universities remains low and the spin-offs do not appear to be able to operate independently in market conditions. Since 2006, the number of technology-based companies created by universities has ceased to grow and the number of patents granted to universities remains at a modest level. The legal basis for intellectual property protection is not yet fully developed in Spain. Furthermore, lack of funding for early stage firm formation and insufficient venture capital remain problems.

The university technology transfer offices (OTRIs according to the Spanish acronym) lack the economies of scale or scope to optimally commercialise faculty innovations. Broadening the understanding of knowledge transfer, knowledge utilisation and exploitation would be useful. By focusing on how university R&D can support jobs, industry productivity and innovation in the region, the university technology transfer offices could move to a system that is based on ongoing partnerships with industry, government and other partners.

International experience shows that while 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. The creation of localised supply networks is therefore critical to the process through which innovation is transferred to enterprises enabling the creation of new innovation that transforms and upgrades existing industries. A well functioning regional knowledge transfer model is based on ongoing relationship between the university and industry to determine what innovations have the best opportunities for adoption and commercialisation, creating an industry-university learning environment. It supports the human capital development required to adopt and apply process and product innovations and works with SMEs as well as large corporations. It measures success in terms of the sustainability and transformation of regional industry and employment growth. University entrepreneurship programmes should therefore also support the existing industries and SMEs.

Andalusia suffers from a lack of dynamic clusters, a low level of applied R&D and innovation due to the predominance of small and medium-sized enterprises (SMEs) in traditional sectors. There is a narrow orientation of knowledge providers and an over-emphasis on high-tech based development.

While the Regional Government of Andalusia and the universities currently have a strong focus on science and technology-led R&D and innovation, there is a need to improve incremental demand-driven innovation and research in non high-tech and traditional industries of relevance to the region, such as construction, tourism, transport, distribution and logistics, new materials and green technologies. Cluster development should be conceptualised across the industry-service divide, to connect, for example the agribusiness cluster with tourism.

Micro-firms – either self-employed or employing less than ten people – represent a larger part of the business fabric in Andalusia, accounting for over 95% of the enterprises. There is a low absorptive capacity and nascent innovation culture in and a lack of tradition of collaboration between small and medium-sized enterprises (SMEs). One consequence of this is a poor articulation of demand for services from the universities for the SME sector. There is a lack of information and data on innovation performance within the private sector and also within universities. A detailed investigation into the nature of innovation within firms, the barriers and problems and the experiences of collaboration with universities could help move forward.

Reaching out to small enterprises through training, knowledge transfer and by student internships is crucial for dissemination of innovation, whether in terms of management, processes, products or services. Universities should systematically target SMEs on a long-term basis, in addition to their focus on support for new business formation. Excellent framework conditions in place, such as an ICT network that reaches out to rural areas, following the implementation of the Guadalinfo project, and a dense network of specialised technology centres that cover the major areas of business activity in Andalusia, should be mobilised for SME development.

The following measures would promote regional innovation in Andalusia:

- In light of the reduction in funding, the regional government should take steps to rationalise – reorganise and reduce – the number of overlapping intermediary organisations, agencies and initiatives and focus on a few promising fields while continuing to develop, diversify and upgrade the existing industries and SMEs. The regional government should improve inter-ministerial collaboration in order to address the pressing needs for workforce development.
- The regional government should improve internationalisation of the region, its business sector and universities through attraction of

talent and foreign direct investment. More attention should be given to the design of policies for attracting high skills and professional technical labour (students, researchers, IT specialists, research scientists etc.). Policy instruments include employee tax incentives, repatriation schemes and improving the attractiveness of academic careers. In Quebec, for example, the government is offering five-year income tax holidays to attract foreign academics in IT, engineering, health science and finance to take employment in the region's universities. In Finland, Nokia has invested in the cultural adaptation of foreign IT workers as a way to improve productivity. Given that these policies need to be customised, talent attraction initiatives may be better designed by regional bodies that have strong industrial connections and a good knowledge of the local labour market. To be more effective, these policies need also to be an integral part of the international co-operation strategy of the region. They can be coupled with initiatives to attract foreign investment, an area where Andalusia is still underperforming (FDI amounted on average to only 1.5% of the Spanish total for the first half of the decade) and where new incentives and policy support are needed.

- The regional government should reduce the bureaucratic burden on companies, new business formation and development, and stimulate entrepreneurship education. It is crucial to better diffuse a risk-taking culture in the academic world and have a detailed entrepreneurship teaching programme rather than impose a compulsory and vague package for each student. Universities should support entrepreneurship throughout the curriculum and build comprehensive support programmes encompassing entrepreneurship training, practical experience of creating new businesses for groups of students and incubation facilities together with seed funds for new graduate ventures. The recognition of the need to promote entrepreneurship training programmes by the regional government is important, but this commitment will only be able to deliver tangible results if at the same time the bureaucratic burden on companies is significantly reduced.
- The regional government should seek to encourage greater collaboration between universities through programmes, joint investments in R&D facilities and incentives. At the same time, stronger efforts should be made to encourage university specialisation and to promote international, national and regional networking by mobilising virtual and digital systems already in place. Andalusian universities should also 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. All Andalusian universities have strategic plans. While the youngest universities recognise local and regional engagement as one of their missions, this is less clear for the older institutions; collaboration is in any case not a part of these strategies. More can be achieved by better established and designed university collaboration and enhancing and emulating the International Excellence Campus type collaboration. Reviewing the state of collaboration in the university sector would provide an opportunity for universities to rethink their priorities and to specialise. In that context, the example of Finland can be contemplated. In Finland, the Ministry of Education has requested higher education institutions to jointly devise regional strategies.

- The Andalusian University System should evaluate the universities' regional engagement. Some universities, mainly through their social councils, have commissioned studies of the socio-economic impact on their environment. There is no formal process for reviewing current regional engagement arrangements of the universities in Andalusia, but evaluation is limited to a few fragmented initiatives. There is a need for higher education institutions to collectively construct an overall monitoring and evaluation system that would cover the 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. Furthermore, the regional government and the Andalusian universities should collaborate to improve evidence basis for regional and institutional decision making through collection, monitoring and analysis of robust data. Common university indicators should be defined, transparency of results should be guaranteed, monitoring and following up the success of programmes should be strengthened and the public dissemination of results improved.
- To improve productivity and innovation in traditional industry and services, and regional development, the regional government should align the ongoing programmes, such as Talentia, with the region's needs and establish special mobility programmes to link the students, graduates, post-graduates and academic staff with the local business 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.

- The universities should see job creation as the focus of innovation activities in Andalusia. Technology Transfer Offices (OTRIs) should assume a wider role in collaboration with industry. In order to ensure that they fully play their role in cementing the value chain, OTRIs will need to be strengthened with professional staff.
- Incentives for universities should be strengthened to increase their capacity to act as technology transfer “agents” to bring non-local knowledge to the region and to create community partnerships.

Rural development in Andalusia

Andalusia's rural areas have a rich natural and cultural heritage and considerable productive strength in agriculture. Despite the assets and the favourable framework conditions created by the Regional Government of Andalusia through investments in connectivity and capacity building, rural development has not yet reached its full potential in terms of tourism and agriculture, which remain at the low end of the production chain.

Andalusia has a major asset for the development of rural areas in forward-looking rural development policies. It was the leading region in Spain for the European Union LEADER programme that has provided for bottom-up capacity building in rural areas. Universities, in collaboration with local and regional authorities, have played an important role in training community development practitioners (University of Cordoba), providing lifelong learning and re-skilling and up-skilling opportunities (University of Pablo de Olavide), conducting research into specific issues and best practices and developing co-operation and research opportunities (UNIA through CEADER, the Baeza site and international co-operation office). The universities also organise cultural events in remote communities (University of Huelva, University of Jaen and UNIA). However, so far, many of these activities have been driven by individual academics and/or departments without institutional commitment or inter-institutional collaboration between the universities.

The Regional Government of Andalusia has made systematic efforts to improve connectivity in rural areas, providing them with adequate ICT infrastructure and services and a framework to improve productivity of rural firms through high-speed internet. The Guadalinfo programme has created a network of public broadband internet centres in rural areas. Furthermore, the regional government's investments in broadband networks in the Andalusian University system and the online university e-learning platform have helped to widen access to higher education in rural and remote communities.

Despite the progress made in the creation of bottom-up capacity building improved ICT infrastructure, full advantage has not yet been taken of the many assets of the rural areas. While Andalusia has a rich natural and cultural heritage in rural areas, including national parks and renaissance towns, quality rural tourism has not yet reached its full potential and universities and vocational higher education institutions remain relatively passive players in the fields of hospitality and tourism through limited provision of education and training programmes, R&D and outreach activities.

In addition, agriculture remains at the low end of the production chain but provides considerable potential for further development: Andalusia is the leading region in Spain for organic agriculture with more than half the organic land cultivated in Spain, but holds fewer processing companies than Catalonia. Andalusia produces over 80% of olive oil in Spain, but most of it is shipped to Italy for packaging and branding. While the universities in Andalusia play an important role in the research and training programmes in olive oil (University of Jaen), supporting the move from traditional green house production to modern precision farming (University of Almeria) and R&D on citrus fruit and strawberries (University of Huelva), so far the efforts have remained fragmented.

The new international excellence campus on agri-food provides an important opportunity to climb up the value chain in Andalusia. This project will be in a good position to address the challenges of the rapidly growing niche areas in agriculture and can help the universities to play a more important role in promoting the development of agri-food production and helping to transform the focus from raw material production to higher value-added products. This project also has the potential to overcome the key weaknesses of the Andalusian innovation system: the limited university-industry linkages, the lack of private sector involvement, the lack of collaboration between universities and with vocational education sector and workforce development and inadequate levels of internationalisation. Strong efforts are needed to collaborate with industry and the vocational higher education sector.

The following measures would enhance the contribution of universities to the rural development in Andalusia:

- A systematic exchange of information and experience should be put in place between universities in rural development matters facilitated by the regional government and/or the international campus of excellence in order to bring greater efficiency and more balanced coverage. Such a forum could organise thematic events, with regular information retrieval and exchange facilitated by a dedicated website. Universities' current connections, initiatives and projects involving stakeholder collaboration, community development and/or outreach in rural areas should be mapped and published on the collaboration platform.
- The Agri-food Campus of International Excellence should work systematically to improve the university-industry linkages and private sector involvement in innovation activities in the agri-food sector. It should focus on collaborative efforts between universities and allow for stronger collaboration with the vocational higher education sector and workforce development to improve job creation in the region. Strong international links with the leading agri-food regions should be created.
- Universities and vocational higher education institutions should combine their efforts to enhance rural tourism through R&D, innovation, education provision and outreach.

Social, cultural and environmental development in Andalusia

Andalusia has considerable cultural, historical and natural assets that offer a broad range of opportunities for the development of the region. At the same time, the region is faced with social and economic challenges including ageing, unemployment and social exclusion. Universities are playing an increasingly important role in facilitating social, cultural and environmental development, but more could be achieved through collaboration and aligning the activities to regional needs.

Universities play an increasingly important role in facilitating social, cultural and environmental development in Andalusia. They provide significant contributions to local development by providing training for health professions in collaboration with the Andalusian Health System. Universities are also making available for public access a wide range of culturally-specific programmes and infrastructure, such as museums, libraries, theatre groups and sporting facilities. They contribute with education and community outreach to sustainable development, cultural vibrancy and public health services. Faculty and students are engaged in outreach activities. Activities are often carried out in the provinces where the universities are located reaching out to urban and rural communities in ways that bridge the gap between the university and the society.

There is, however, a lack of critical mass to generate projects which have strong impact at the local and regional level. There are some impressive collaborative mechanisms among the universities and the regional government, most notably in the field of public health services to ensure quality personnel, but also between universities for example in the cultural programming through the Atalaya project. In many cases there is, however, scope for stronger collaboration to build joint capacity and to foster joint efforts for regional development. This is necessary to ensure that limited resources are not spread thinly and that the projects will generate multiplier effects.

There is considerable potential in a number of fields, such as generating green growth, supporting cultural tourism and cultural and creative industries and enhancing long-term community development. This would

entail mobilising universities' teaching, research and service functions and better aligning them with the region's needs.

Andalusia could capitalise on its accumulated know-how and wealth of experience in the development of comprehensive training for the public health system.

One of the major successes in regional collaboration between the Regional Government of Andalusia and the tertiary education sector has been the development and implementation of the Strategic Plan for Comprehensive Training in the Andalusian Health System. The plan provides for compulsory clinical practice for health professionals as well as specialist training and professional development. Joint investments and collaboration in training have helped improve the health outcomes in Andalusia and the quality of healthcare delivery. This is one of the significant strengths in the region and could entail significant export potential.

Andalusia could also capitalise on its multi-cultural heritage with three cultures and the presence of migrants from North Africa to boost cultural tourism, foreign direct investment and ethnic entrepreneurship.

Andalusia's multi-cultural heritage, geographical location, connections with North Africa and the presence of migrants from this area constitute strong assets that the region could capitalise on in developing cultural tourism, attracting foreign direct investment, integrating migrant population and encouraging ethnic entrepreneurship. There is scope for expanding joint efforts in this domain which represents "a low hanging fruit" for the region.

The growth of the markets and improvements in educational attainment levels and public management in the Middle East and North African countries (MENA) provide Andalusia an opportunity to improve its export balance and economic development. Andalusia's unique history with co-existence of three cultures in *Al Andalus*, Islamic architectural heritage and the largest mosque in the western world are potential magnets for attracting high-end tourism from the Arab countries. Universities could provide their expertise in designing new services with the help of their partners in North African countries. They could also assist in targeting part of their entrepreneurship activities at the immigrant community which often represents the most entrepreneurial segment of the society.

The following measures would enhance social, cultural and environmental development in Andalusia:

- The regional government could capitalise on its accumulated know-how and wealth of experience in the development and implementation of comprehensive training in the Andalusian Health System, that provides compulsory clinical practice for health professionals as well as specialist training and professional development. This is one of the significant strengths in the region and could entail considerable export potential.
- The regional government and the universities could capitalise on Andalusia's multi-cultural heritage, geographical location, connections with North Africa and the presence of migrants from this area constitute in developing cultural tourism, attracting foreign direct investment, integrating migrant population and encouraging ethnic entrepreneurship. There is considerable scope for expanding joint efforts in this domain for example in cultural tourism.
- The regional government could encourage collaboration between tertiary education institutions and industry to boost green growth and eco-innovation. Skill creation for green jobs should be more efficiently organised by pooling learning resources of educational institutions and industries in Andalusia and providing flexible pathways between educational institutions.
- The regional government could consider providing stronger incentives for “challenge-driven” research to connect university research to community development. In order to make the connection between the current research focus and a more broadly defined third mission, “translational research” could be adapted to address the critical issues that bridge the university and community. In addition, university leaders could develop initiatives supported by small research grants to encourage faculty to undertake research activities that connect with community agendas.
- The Andalusian universities should develop a forum for social, cultural and environmental development to build on strengths, to identify unexploited opportunities and to address the regional needs. An exchange forum should be put in place to, track and monitor different initiatives and their outcomes and identify best practices for publication and policy fine-tuning. Such a forum could organise thematic events, with regular information retrieval and exchange facilitated by a dedicated website. As a first step, universities' current connections, initiatives and projects involving stakeholder

collaboration, community development and/or outreach should be mapped and published in the collaboration platform. Universities' social responsibility reports could serve as a basis to develop a social responsibility plan for the Andalusian University System to further enhance their engagement in cultural, social and sustainable development.

- Universities in Andalusia should capitalise on Andalusia's attractiveness to international students and tourists. Universities in Andalusia could take a leadership role in regional initiatives to develop strategies to take full advantage of its cultural and historical heritage. They could 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 extension efforts. Existing programmes should be extended further and linkages should be established with the cultural industry and international networking to connect the region internationally. Universities should also more actively contribute to the skills development and innovation needs in tourism.
- Universities should improve the monitoring and follow-up of the success and results of their initiatives, projects and programmes to show return on public investment. The lack of robust and comparable data constrains the visibility and impact of universities' activities. It also makes difficult to measure the success or failure of programmes. Universities' social responsibility reports could be used as a framework for the systemic mapping of activities.
- Universities should in collaboration with regional and local governments, schools and the private sector, reach out to socially underprivileged population to ensure social and economic cohesion. Current activities need to be scaled up in a systematic way, including long-term multi-stakeholder collaboration to raise aspirations among youth in socially unprivileged population and to improve their quality of life. Universities should also reach out and empower the migrant population to address their own challenges through community development programmes.

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 2008-10.

This OECD Review of Higher Education in Regional Development of Andalusia in Spain (<http://www.oecd.org/dataoecd/45/3/46528648.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.