



Education and Culture

Linking the worlds of work and education through Tempus



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"Co-operation between universities and industry need to be intensified at national and regional level, as well as geared more effectively towards innovation, the start-up of new companies and, more generally, the transfer and dissemination and knowledge".

Communication from the European Commission on the role of the universities in the Europe of knowledge.

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Foreword

In a true knowledge society, where higher education becomes a necessity for almost half the population, universities can no longer act as an entirely independent academic force. They must tune an increasing proportion of their activity into the needs of students whose employability is at stake, and towards the needs of society at large.

They can only do this successfully by operating in close partnership with the worlds that will employ their students after graduation – the worlds of public and private organisations and enterprises, the civil service, and the world of entrepreneurship in which the self-employed will operate.

In Europe, synergy between enterprising forces and educating forces has become an aim of seemingly ever-increasing importance. It is at the heart of such core EU developments as the Lisbon process, aiming to make Europe the most competitive knowledge-based society in the world. It is one of the key aims of the university modernisation agenda that the European Commission presented in May 2006.

In fact, all EU programmes involving the education sector include cooperation with the world of work. The most important one, the Leonardo da Vinci programme, plays an important role in preparing European citizens for entering the labour market, by taking companies' needs into consideration and building a skilled European workforce in an increasingly competitive world. In the past ten years, several major European education reform processes have been launched with such cooperation at the very heart of their philosophies – think of the Bologna Process and its drive towards the employability of university students, and of the Copenhagen Process and its international labour market orientation.

This need to align education to the needs of the economy is no different in the countries that surround the EU. However different some of their education systems and economies may be from those of the EU Member States, they operate in a globalised world with ever-increasing international competition. Many look forward to free-trade agreements with the EU and each other that will greatly benefit them, but that will also expose their economies to harsher forms of competition than they may have faced to date.

Yet experience from the Tempus programme – through which the EU supports higher education in its neighbouring regions – shows time and again that cooperation between the worlds of education and work is still largely untrodden territory in most of these countries. Implementing university-enterprise cooperation projects has too often been an uphill struggle against academic resistance, industry prejudice and government accreditation processes.

Experience from earlier Tempus initiatives to promote university-enterprise cooperation also shows that efforts in the right direction are often stifled by a lack of basic understanding of the key principles that underlie university-enterprise cooperation, and of the urgency of the issues at stake.

As a response, this publication aims to address some common misunderstandings about university-enterprise cooperation, to offer an understanding of its concepts, and to offer advice on how best to apply these.

It tries to explain how university-enterprise cooperation has evolved in the EU – not on a political whim, but as a creative response from the world of learning to its changing role and environment. It explains the principles of university-enterprise cooperation and offers practical examples, both from the EU and from all the regions in which Tempus operates. It also offers clear recommendations for authorities, universities and enterprises.

Most of all, it underlines the message that cooperation between the worlds of education and work is no longer something that enterprising universities can pursue at leisure, simply to gain an edge or fill a niche. It may actually be a matter of survival for universities and companies in the world as it is today.

We are particularly grateful to H.E. Dr Khaled Toukan, Minister of Higher Education and Scientific Research of Jordan, who hosted a Tempus conference on university-enterprise cooperation in April 2006, which greatly contributed to enriching the present report.

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1. Executive summary

Cooperation with the world of work is no longer an optional activity for higher education institutions. It has become a necessity.

Mass access forces universities to step beyond their limited role as guardians of the world's intellect. Mass access also forces higher education to look beyond the public authorities for funding, as these can no longer bear the brunt of this expensive education alone.

Globalisation, technological developments and the advance of the knowledge society mean that more higher education graduates are needed today than ever before. Concern for their employability obliges their educators to gain intimate knowledge of their future work places.

New trends in the labour market have changed the demands on university graduates and continue to change these in such a way that change itself is the only thing likely to remain the same in the decades ahead. Such change requires flexibility and a close monitoring of the labour market. It also creates a continuing need for training on the part of individual enterprises – a need that presents new opportunities for higher education.

Increased cooperation between higher education and the world of work can offer both new sources of funding and greater relevance for modern higher education. It can offer better human resources for the labour market and access to a great source of expertise for enterprises. All of this is much needed, which is why such cooperation is an imperative, and not something universities can choose to ignore.

Governments with a concern for social welfare and economic growth have an obligation to create an encouraging environment by adopting supportive legislation and offering financial incentives where they can.

Universities must take the lead in developing partnerships with the world of work, as it is they who have the principal responsibility for the employability of their students.

Enterprises must be made aware of the myriad mutual benefits of such cooperation and must be encouraged to engage in partnerships with the institutions that train their future employees.

Cooperation between universities and the world of work (university–enterprise cooperation) is a priority for the European Commission. Tempus is its main instrument of support to higher education in the neighbouring regions. The European Commission is therefore committed to maximising the contribution of the Tempus programme to university–enterprise cooperation in these regions. In order to provide effective support, however, it must have a clear overview of the current situation on the ground. To this end,

in 2005 the European Commission launched a study to map the state of affairs in university–enterprise cooperation in the Tempus partner countries¹.

The study found examples of good practice in university–enterprise cooperation in all of the current Tempus regions, but it found these mainly in areas where higher education and research activities traditionally existed. It also found that the cultural obstacles blocking further cooperation are still significant.

Universities and enterprises do not recognise the full potential of cooperation. Universities seem to be lacking in entrepreneurial spirit and remain strongly academically oriented. Enterprises are generally focused on short-term results: most of them are very small and struggle to survive. They are looking for quick solutions, which universities usually cannot provide.

On both sides there is little awareness that economic growth and the need for increased competitiveness through innovation would further increase the demand for high-level qualifications.

The environment in which universities and enterprises operate does not encourage closer cooperation, and neither do internal structures at universities and enterprises. Existing legislation and strategies do not provide much support. Social partners have not yet taken up potentially pivotal roles.

All this is aggravated by a lack of financial incentives and a general scarcity of funds.

¹ In the Western Balkans: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro, Kosovo. In Eastern Europe and Central Asia: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, the Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan. In the Mediterranean region: Algeria, Egypt, Jordan, Lebanon, Morocco, the Palestinian Authority, Syria, Tunisia.

A sixfold return

Top North American universities earn six dollars for every dollar invested in Technology Transfer Office staff, the Milken Institute wrote in a 2006 report on the practice of technology transfer. The report also found that for each additional year that such an office operated in one of the universities studied there was an average USD 228,000 increase in incremental licensing income generated for the university.

The *Mind to Market* report generally shows the importance of research to a university's – and indeed a whole region's – bottom line. This of course applies especially to universities that have a strong biotech component, a well-functioning office of technology transfer and proximity to companies that want to pay for their services.

'Universities around the world have expanded their mission beyond that of basic research and teaching to become places where knowledge fuels patent development, business collaborations and incubators for start-ups,' the report says.

To judge and understand this trend, the authors of the report compared university technology transfer processes around the world; studied the characteristics common to successful commercialisation; and measured the role of the university offices of technology transfer (OTT).

The report does not shun the controversial nature of technology transfer. The authors are aware that some believe a university should focus on basic research and teaching, not on trading its intellectual property. But they argue that commercially viable research discoveries teach universities that their work can be applied to benefit society at large, and that innovation costs can be partially recovered in the marketplace.

'Technology transfer reflects the delicate balance of a university's wider culture and is, in fact, an important by-product of its mission,' says Ross DeVol, Director of Regional Economics at the Milken Institute and the report's lead author.

'Universities that don't encourage the commercial application of their research assets will not assist economic development in their communities and contribute fully to national competitiveness.'

Note: The Milken Institute is an independent economic think-tank. Its report is recommended reading for anyone interested in university-enterprise cooperation. It can be obtained from the Milken Institute's website at www.milkeninstitute.org.

A supportive environment needs to be developed, one that has the potential to break the dominant cultures at universities and enterprises and that could help to develop strategies for new ways of cooperating. Such an environment must comprise appropriate legislation, financial support, incentives, and support structures and mechanisms.

However, closer interaction between the worlds of work and education is so urgently needed that an unsupportive environment should never be a decisive obstacle that stands in the way of small-scale pioneering initiatives. As is illustrated in the following chapters, elsewhere in the world such cooperation initially also developed in adverse environments. But in this field legislation tends to follow practice, rather than the other way around.

2. Background to this publication

Cooperation between the worlds of learning and work is at the heart of a variety of EU policies. In the field of higher education it has been actively promoted for more than two decades. Through its Directorate General for Education and Culture (DG EAC) the European Commission also wishes to increase the effectiveness of community support to university–enterprise cooperation in the regions neighbouring the EU.

For almost two decades now community support to higher education outside the EU has been channelled through the Tempus programme. Tempus is the EU programme supporting cooperation between higher education institutions in the EU and their counterparts in countries surrounding the EU. Tempus was launched in 1989 to prime university links with Poland and Hungary, but soon came to cover all of the current new member states. Today Tempus grants support higher education reforms in four partner regions: Eastern Europe, the Western Balkans, the Mediterranean and Central Asia.

In July 2004, at a Tempus meeting involving representatives from the EU member states and Tempus partner countries, the importance of university–enterprise cooperation for the higher education reform agenda in the current Tempus partner countries was discussed. In this context, DG EAC presented its idea to launch a study on the role of the Tempus programme in university–enterprise cooperation. The results of this study were published in a summary report by the ETF in 2006².

This publication builds on that report, as well as on a Tempus seminar in Amman on the topic of university–enterprise cooperation and broader Tempus experience in this area. It aims to bring the recommendations and conclusions of the report and the seminar to a wider audience.

2.1 Structure

Because the survey and study visits suggested that general awareness of the need for university–enterprise cooperation was low, this publication also tries to explain the rationale behind such cooperation in a way that makes it accessible to policy makers, human resources managers, social partner organisations and universities.

Chapter 3 contains a description of university–enterprise cooperation in the EU and other western countries, and attempts to explain how it has evolved almost naturally with the advance of high technology, mass access and globalisation.

² *Tempus study on university–enterprise cooperation*, European Commission, DG Education and Culture, 2006.

What follows is a short introduction to the views and activities of some international organisations on the issue.

Chapter 4 introduces the theory of university–enterprise cooperation, placing the lessons learnt in Europe and North America since the 1970s in a framework of concepts for use in other situations.

In Chapter 5 we move to the current Tempus regions and provide an overview of the results of the abovementioned survey, study visits and seminar.

Finally, Chapter 6 attempts to summarise the issues into some clear recommendations, addressed separately to policy makers and government representatives, and university staff and business managers.

Throughout the document the reader will find boxed examples of good and bad practice, practical examples of solutions tested both in Europe and in the Tempus partner countries.

It is hoped that this publication will help to create more awareness of the importance of university–enterprise cooperation and fuel the debate on its future development.

2.2 Definitions

Enterprise

Throughout this publication, 'enterprise' refers to any entity with economic activity, regardless of legal status. This can include multinationals, SMEs and even actors in the informal economy, as well as NGOs, semi-public institutes, chambers of commerce, professional associations and the training bodies of these.

University

For the sake of readability, 'university' covers any type of higher education establishment (tertiary level, ISCED V and VI) unless otherwise specified.

2.3 The original research

The research that formed the basis of the abovementioned summary report was intended to provide an overview of current university–enterprise cooperation in the Tempus partner regions and to give recommendations on how to enhance it in the future.

The research methodology followed comprised four steps.

1. Online questionnaires in English, French and Russian were developed. Different questionnaires were used for universities, enterprises and the offices in charge

of providing information on Tempus in the partner countries – the National Tempus Offices (NTOs).

2. The questionnaires were sent to approximately 800 representatives from the Tempus partner countries. These included universities, enterprises, NGOs, social partners, regional and local development agencies, technology transfer centres and continuing training centres.
3. Study visits were made to countries with interesting examples of university–enterprise cooperation. These included Egypt, Morocco, Serbia and Montenegro, the former Yugoslav Republic of Macedonia, the Russian Federation and Moldova.
4. Finally, a summary report was drafted on the basis of an assessment of the returned questionnaires, desk research and field visits.

Challenges encountered

Given the diversity and heterogeneity of the regions, universities and enterprises covered by the survey, and given the uneven reply rate³, the findings had to be considered with caution. They nonetheless allowed the identification of main trends in the area of university–enterprise cooperation in the Tempus partner regions. They identified common issues relating to university–enterprise cooperation and good practice from all regions. The results show a clear bias towards universities as they represent the majority of those that were contacted through the site visits and those that completed the questionnaires.

It became obvious through the site visits that the enterprises involved in cooperation are often managed by university professors who work at both places. Mainly as a result of poor salary conditions for academic staff, it is quite common in all four regions for university professors to hold several jobs. Very often their side activities are in SMEs that provide consulting services or operate in the engineering and ICT areas. Although the survey covered mainly universities and enterprises involved in the Tempus programme, the intention was not to describe Tempus projects only, but to provide a broader picture of university–enterprise cooperation. The National Tempus Offices offered a more comprehensive picture.

³ Around 20%, or a total of 154 questionnaires, were returned. Of these, 110 were completed by universities, 22 by enterprises and 22 by National Tempus Offices (NTOs). Of the universities, 39 were from Eastern Europe and Central Asia, 31 from the Western Balkans and 22 from the Mediterranean partners. The origin of 18 questionnaires could not be identified. Of the enterprises who replied, 13 were private, 7 were public and 2 could be defined as mixed private–public enterprises. The majority of the private enterprises (eight) were from the Mediterranean partners, four were from the Western Balkans and only one from the Russian Federation. Of the seven public organisations four were based in the Western Balkans, two in the Mediterranean and one in the Russian Federation. The two private–public responses came from the Western Balkans and Mediterranean partner countries. Of the National Tempus Offices, ten answers were submitted from Eastern Europe and Central Asia, six from the Western Balkans, and five from the Mediterranean. Most respondents were in top or upper middle management positions in enterprises (often either owners or partners of SMEs), while senior management were involved at universities.

The Amman conference

A seminar entitled Tempus in Touch: University–Enterprise Cooperation was organised by the European Commission, in close cooperation with the Jordanian Ministry of Higher Education and Scientific Research and the National Tempus Office, and held in Amman, Jordan, on 9–10 April 2006. It was launched as an initiative to create a broad forum for exchange and dissemination of existing models and best practice examples between the EU and Tempus partner countries.

The event brought together around 170 participants from the 25 EU member states and the 26 Tempus partner countries. Participants included EU and partner country experts and stakeholders such as representatives from the ministries of education and labour, employers and employers' organisations, and universities, current and completed Tempus projects, several National Tempus Offices and EU countries' National Contact Points, –, and the European Commission, including EC Delegations from the region.

The seminar was designed as a forum to raise awareness about existing models of university–enterprise cooperation and about its importance as a way of enhancing the employability of university graduates.

A number of case studies and examples of best practice were presented illustrating the strengths and weaknesses of existing university–enterprise cooperation and giving rise to fruitful debate among policy makers, representatives of universities and businesses, and international and donor organisations as the key players in university–enterprise cooperation.

3. University–enterprise cooperation in the EU

3.1 History

Mass access

Europe has an academic tradition that goes back a thousand years. Throughout most of this period, universities were places where limited numbers of scholars and scientists devoted their lives to independent thinking, advancing science and teaching students. This changed radically in the 20th century when sudden demographic pressure, progress in technology and a breakdown of traditional class and gender patterns put a bomb under academia's ivory tower.

By 1975 higher education had become a common good that was accessible, in theory, to all. Participation in higher education continued to rise exponentially until the end of the millennium, with a doubling of the total number of students in Europe between 1975 and 1995.

To say that this strained European academia would be an understatement. European universities burst at their seams and were forced to commence a long process that has still not been completed today: redefining their role in society.

Over the same period of time, European labour markets were gradually shifting from industry towards services and from production towards research, design and development. The need for graduates grew year on year and the demands on these graduates changed all the time. In order to avoid all students ending up unemployed, an increasing number of studies had to be tuned in to the needs of the labour market. This was the prime motivation for higher education to seek closer collaboration with its environment.

The escalation of student numbers had another grave consequence: it strained the available budgets for higher education. Higher education in Europe is traditionally publicly funded, and public funding could simply not keep pace. Alternative means of funding had to be found, and this, too, forced the higher education sector to search for new partners.

Academic resistance

The need for changes was not always easy to accept for traditional scholars and scientists who considered their independence to be at risk. As a result it was typically the

non-academic higher education institutions that showed the way towards innovative solutions. Being by nature more vocational, they typically had stronger connections with their public and private environments. Furthermore, their tremendous expansion had demanded new governing mechanisms at an earlier stage than at the traditional universities. Administrative directors or boards of directors increasingly worked in parallel with the traditional academic leaders – the vice-chancellors or rectors, and the deans. Business-style managers were often better prepared for the task of running the administration of a university educating thousands of students at a time.

These new higher education managers had considerably fewer misgivings about collaboration with enterprises than the faculty deans who until that time had been the main decision makers in academia. Many even found – often creatively, and indeed well in advance of more accommodating legislation – ways to attract extra funding for core activities through the provision of training and research services to public and private partners. In turn, they began to consult the future employers of their students and future 'clients' of their 'products' on a much wider scale than before, so as to increase the relevance of their activities and the employability of their graduates.

These trends are not unique to Europe. Dramatic increases in enrolment and the move towards more diversified funding sources are global phenomena. In the mid-1980s, for example, public funding accounted for an estimated 85% of revenue in higher education worldwide. By 2001 this had fallen to 43%. During the same period the number of full-fee-paying foreign students soared from an almost negligible few thousand to almost 150,000⁴. In the USA, student tuition fees at state institutions increased by more than 25% between 2000 and 2005⁵.

⁴ Marginson and Considine, *The enterprise university*, Cambridge University Press (2001).

⁵ *On the edge: securing a sustainable future for higher education*, OECD (2004).

An example with mixed results: the French professional licence

The research centre Céreq⁶ carried out a study on the professionalisation of universities in France between 2001 and 2003, and reviewed in particular the results of the introduction of the 'professional licence' – a professional Bachelor's degree. This diploma was created in 1999 to develop professionally oriented education and training within universities. It is based on three principles: innovative teaching methods, a mixed target audience and partnership with trade and industry.

The 'professional licence' offered a number of genuinely new features, but it did not meet all expectations in terms of cooperation with the world of work. This was because most of these diplomas were still created at the initiative of teaching staff rather than of the business world. Teachers and instructors controlled the definition of the training content, based on their intuition and their contacts and familiarity with the labour market. Only a quarter of these diplomas have been developed in response to requests from business organisations, occupational branches or, more rarely, individual companies.

An interesting feature of this diploma is that it is spreading to nearly all traditional university disciplines including, for example, the humanities and the social sciences.

The professional bodies that take part in the definition of the 'professional licence' are consulting bodies that do not directly represent the future employers but maintain working relationships with them, such as the Chambers of Commerce and Industry, Chambers of Agriculture, and Regional Centres for Innovation and Technology Transfer.

Even where companies are beginning to be involved in the definition of curricula, they are not yet quite ready to assign their staff to teaching roles, although this was intended to be one of the important features of the new diploma. The lack of financial means for remunerating experts from the professional world is a partial explanation for the lack of involvement of companies. They still limit their role to classic forms of participation, and do not show a real commitment to the entire process of defining and implementing these new training programmes.

Policy intervention

With the advance of the knowledge-intensive economies in Europe, the issue of university–enterprise partnerships also became more prominent on the agenda of European higher education policy makers. Attempts were made to allocate funds more selectively, with more specific demands and purposes, and dependent on clear outcomes. Incentive schemes were devised, offering seed money, matching funds or tax breaks for partners in successful university–enterprise partnerships.

⁶ *Training and Employment* n°57, Céreq (2004)

With the parallel advance of globalisation and the expansion of the European internal market came the need to prepare students for international careers and to raise their cultural awareness. In this, the traditional universities had an edge, as much of the scientific and scholarly research in which they engaged had traditionally been international in nature. The leading sponsors of mass internationalisation in higher education, however, were the policy makers.

Making cooperation work

The province of Dalarna in Sweden combines steel and paper industry in a number of relatively small towns with large areas of sparsely populated countryside. By tradition, people in Dalarna have some of Sweden's lowest rates of tertiary level education. The establishment of the university in 1977 did little to change this situation.

Change came quite suddenly in the late 1990s, when the university began to set up a number of steering councils bringing together representatives of different areas of working life. External representatives chaired these councils. These bodies had a considerable amount of influence on two undergraduate programmes.

The first of these bodies was the Council for Educational Development. It has had a major impact on the structure of teacher education, on the types and rates of in-service learning and on the development of the schools themselves, combining research and practice.

This was followed by the establishment of similar bodies covering the social services, healthcare and industry.

As a result, Dalarna University has doubled its student numbers during the past five years. It is now the Swedish university with the highest proportion of students from families with no academic background (37%).

Note: Dalarna University was the subject of a case study in the OECD magazine Higher Education Management and Policy. A detailed description of the methodology can be found in volume 18, issue no. 2 of the journal.

The European Commission launched, in rapid succession, a series of support programmes, one of these being the Erasmus programme, which encouraged literally hundreds of thousands of European students to pursue a part of their degree in another European country.

The European ministers of education, on their own initiative, launched the Bologna Process (see box) with the aim of streamlining European higher education to make it easier for students to gain international experience – thus increasing their employability – and to make it easier for anyone in Europe to grasp the value of any other European degree.

University–enterprise cooperation and the Bologna Process

At the launch of the Bologna Process, its driving force was transparency. In time this came to encompass quality, employability, relevance, and flexibility through internationalisation. The removal of mobility obstacles, the establishment of compatible academic degrees and the introduction of a common credit system have had a positive impact on opening up universities both internally and externally.

European education ministers, meeting at the Bologna follow-up summit in Bergen in 2005, urged universities to ensure that their PhD programmes were in tune with the labour market. They wanted to ensure that these programmes too would promote interdisciplinary training and the development of transferable skills, thus meeting the needs of a European employment market that increasingly relies on high technology and brain power. Up until recently, syllabi would set out which topics students were required to cover – one by one. The current trend is towards more generic descriptors that define what skills the students must have acquired during their studies. The underlying purpose is, again, to enable students to be more employable when they leave the world of academia.

The Bologna Process

The Bologna Process is the common name for the progress towards a European Higher Education Area. It has developed into a major reform exercise that currently covers 45 countries, thus well exceeding the boundaries of the EU. Harmonisation is still a politically sensitive word in this respect and this is causing a lot of confusion, but improving comparability and compatibility is really what current reforms in higher education in Europe are all about.

The 1999 meeting in Bologna that sparked the process was preceded by a meeting in spring 1998, when education ministers from France, the UK, Italy and Germany met at the Sorbonne University in Paris to discuss ways to move towards alignment of the structure of their higher education systems. They signed the Sorbonne Declaration which would be the precursor of the Bologna Declaration that was signed by 29 European education ministers in Italy a year later.

The Bologna signatories agreed to establish, by 2010, what they called a European Higher Education Area and to work on the international promotion of a European two-tier higher education system modelled on the one commonly used in the Anglophone world. The European system would consist of two main cycles: an undergraduate cycle, leading to a Bachelor's degree, and a graduate one, leading to Master's and doctoral degrees.

They agreed to adopt a credit transfer system to facilitate international mobility even within cycles, to work on European quality assurance and to promote a European dimension in higher education. They also promised to work hard at removing obstacles for mobility – from visa procedures right down to the level of housing and student services. Finally, they agreed to report back in two years' time in Prague.

In the run-up to that first follow-up meeting in Prague in 2001, European students and universities prepared their responses to this display of ministerial initiative during meetings in Göteborg and Salamanca. At the latter, incidentally, the Association of European Universities and the Confederation of European Union Rectors' Conferences merged into the European University Association (EUA). Together with the European Commission, they are now fully involved in the further development of the process.

The reforms today are based on ten fairly simple objectives which governments and institutions are implementing.

For more on the Bologna Process see www.dfes.gov.uk/bologna.

3.2 European Commission encouragement

In different communications, and through various programmes for the promotion of education and training launched since the 1980s, the European Commission has promoted university–enterprise cooperation as a means of increasing the relevance of education to the needs of the labour market, of improving graduates' employability and of maximising the use of knowledge.

It launched the Comett programme in 1986 to strengthen cooperation between universities and enterprises in the fields of training and technology. Through Comett, a large number of partnerships between universities and enterprises were set up and grants were awarded for staff exchanges between universities and firms.

More recently, the 2001 Commission report *The concrete future objectives of education systems*⁷ mentioned that there was consensus about the need to open up education systems to the influences of other parts of society – both those that are close to schools (parents, local institutions, local businesses) and those that are more distant. It argued that local businesses are a resource in providing a perspective on the future needs for skills, as well as a potential introduction for learners into the way in which the business world works.

⁷ *The concrete future objectives of education systems*, COM 59, European Commission (2001).

Tuning

In 2000 a large group of European universities collectively took up the Bologna challenge and designed a pilot project called *Tuning educational structures in Europe*. Abbreviated to *Tuning*, the project addressed several of the Bologna action lines and identified points of reference for generic and subject-specific competences of first- and second-cycle graduates in a series of subject areas.

Informed initially by a wide-ranging survey on the competencies required and expected from graduates, the project brought about a detailed examination of subject areas and boosted the compatibility, transparency and recognition of degree programmes throughout Europe.

Tuning follows a student-centred approach. It focuses on learning outcomes expressed in terms of generic and subject specific competences, emphasising skills for employability and seeking to make these explicit and well understood.

The project contributes greatly to the participating universities' understanding of the European Credit Transfer System (ECTS) and its progress into an accumulation system. It also generates a deeper understanding of the whole process of learning, teaching and assessment by helping to establish reference points, a common understanding. It encourages convergence while recognising the importance of diversity. It does not seek harmonisation or definitive European curriculae. Above all, by stressing the importance of learning outcomes in terms of competences, it helps to recognise the skills which graduates acquire and need for the world of employment and make them transparent.

In 2003 a Commission communication entitled *The role of the universities in the Europe of knowledge*⁸ argued that the need for global competitiveness demands that knowledge flows from universities into business and society. Cooperation between universities and industry must be intensified and geared more effectively towards innovation, the start-up of new companies and, more generally, the transfer and dissemination of knowledge.

In 2005 the European Commission adopted a follow-up communication⁹ warning that if nothing is done, the gap with the EU's main competitors in the field of higher education will continue to widen. The communication identified three priority areas for reform of European universities, one of them being the need to increase and diversify their funding sources. Inadequate funding and inflexibility of systems are such acute problems in some countries that they impede the reform process at universities.

⁸ *The role of universities in the Europe of knowledge*, COM 58, European Commission (2003).

⁹ *Mobilising the brainpower: enabling universities to make their full contribution to the Lisbon strategy*, COM 152, European Commission (2005).

In order to encourage closer links between universities and industry, the Commission proposes tax incentives as a way of promoting these partnerships. It points to the fact that EU countries spend on average just 1.1% of GDP on higher education, on a par with Japan, but much less than Canada (2.5%) and the US (2.7%). A major difference is that while European higher education continues to rely almost exclusively on limited public funding, much stronger and lasting expansion has been possible in competitor countries thanks to a greater diversity of funding sources, with much higher contributions from industry and households. Private investment in higher education in the EU amounts to less than 0.2% of GDP, compared to a weighted OECD average of 0.9%. Private investment in higher education in the US is about ten times higher (1.8% of GDP), while in Japan it is 0.6%. The Commission estimates that an investment of 2% of GDP is the minimum needed for knowledge-intensive economies.

It argues for an in-depth revision of curricula to ensure the highest level of academic content but also to respond to the changing needs of the labour market, and promotes various types of public-private partnerships to mobilise additional human and financial resources¹⁰.

The communication *Modernising education and training: a vital contribution to prosperity and social cohesion in Europe*¹¹ stressed again that strengthening collaboration between higher education and industry is recognised by most countries as a basic requirement for innovation and increased competitiveness, but that too few European countries have a comprehensive approach to this issue.

3.3 The views of some international organisations

Many international organisations have paid specific attention to the need to reinforce university-enterprise cooperation and have developed special programmes to promote it.

OECD

The OECD Directorate for Education continues to dedicate seminars and studies to the issue of public-private partnerships in science and technology. It expects such cooperation to change the interface between universities, the private sector and governments. It has also studied universities' innovative practices in entrepreneurial activities, primarily in the framework of the changed demand from (and new strains on) universities as a result of mass access to higher education (see 3.1).

¹⁰ *Investing efficiently in education and training: an imperative for Europe*, COM 779, European Commission (2002).

¹¹ *Modernising education and training: a vital contribution to prosperity and social cohesion in Europe*, COM 549, European Commission (2005).

In a 1997 policy analysis, OECD experts had already written that 'governments cannot expect to promote strategies for lifelong learning by directly controlling tertiary education. On the contrary, there is a need to build up the capacity of institutions to manage themselves and to forge new partnerships with employers and others, to help meet economic and social demands. An important requirement of these new partnerships is to move beyond a view of graduates as people with homogeneous attributes and knowledge, and beyond a single narrow conception of what a first degree or diploma should certify.'

OECD work is also instrumental in actually measuring changes in higher education funding. Noting that while 'many tertiary structures and programmes were designed for a different era, so too were its funding mechanisms', the 2006 edition of *Education at a Glance* records a decrease in the average share of public funds in total higher education funding in OECD countries that becomes ever more marked from 2000 onwards. It must be noted, however, that private funding in this context comprises both individual and corporate investments in education.

Perhaps most relevant to the topic of this publication is the 2002–2003 OECD/IMHE–HEFCE¹². In eight OECD member countries, this project examined ways to increase the sustainability of higher education institutions by mapping strategic financial management needs in the current policy and funding environment. Each country produced national reports. A task group including representatives of the eight participating countries then steered the project towards its conclusion with an International Conference in January 2004 and the publication by the OECD in July 2004 of a major report, *On the edge: securing a sustainable future for higher education*. The report concludes that new forms of partnership are needed between institutions and their environments, including the state, that support increasingly autonomous universities in taking a more strategic view of their role.

UNESCO

Following the 27th UNESCO General Conference in 1993, the UNISPAR Programme¹³ was established to strengthen university–industry cooperation in science, engineering and technology, because 'the application of science and technology is the main agent of industrial, economic and social development'. In the *Delors Report*¹⁴ to the UNESCO International Commission on Education for the 21st Century, a chapter is dedicated to the need to better link education to the world of work. The report observes that cooperation with industry and agriculture has been proven to increase the quality of tertiary education in countries in transition and in developing countries. Interestingly, it adds that this was particularly the case where such cooperation was supported by national authorities. Direct involvement of university students and teachers brings a wealth of advantages. Students

¹² OECD/IMHE is the Organisation for Economic Co-operation and Development Programme on Institutional Management in Higher Education. HEFCE is the Higher Education Funding Council of England.

¹³ See www.unesco.org/unispar.

¹⁴ *Learning: the treasure within*, Report to UNESCO of the International Commission on Education for the 21st Century, Unesco Publishing (1996).

learn to work in groups, they face real problems from concept to market impact, and they gain an understanding of the interaction between information processing and experimental work, cooperation in pilot production, market opportunities and market development. Finally, they are able to develop entrepreneurial skills and recognise self-employment opportunities.

World Bank

Rather than approach university-enterprise cooperation (or university-industry cooperation, in its own jargon) as a separate issue, the World Bank views it as being inextricably connected to the development of Education for the Knowledge Economy (EKE), which is one of its priority areas and which guides much of the support it provides to higher education.

World Bank assistance to EKE aims at helping countries to adapt their entire education system to the new challenges of what it calls 'the learning economy'. It has two complementary main aims. The first is the formation of strong human capital. The second is more relevant to the topic of this publication: the construction of an effective national innovation system. To the World Bank, a national innovation system is 'a network of firms, research centres, universities, and think-tanks that work together to take advantage of the growing stock of global knowledge, assimilate and adapt it to local needs, and create new technology'. Tertiary education figures prominently in national innovation systems, serving not only as the backbone for high-level skills but also as the traditional home of basic and applied research.

4. The concepts and theory of university–enterprise cooperation

4.1 Benefits of university–enterprise cooperation

In order to be successful, cooperation between tertiary education and its enterprising environment must be mutually beneficial. Universities must recognise the need to engage closely with the environment in which their students will find employment. Enterprises also need to recognise the added value of such partnerships for themselves. When designing partnership strategies, universities need to take this aspect into account.

What can universities gain from cooperation with enterprises?

They can:

- better adapt education and research to the actual needs of the society;
- increase students' practical understanding of enterprises and educate them for professional practice;
- prepare students for employment and widen job opportunities;
- bring an international dimension to education;
- retrain university staff and researchers and improve university teaching by introducing new learning approaches;
- use companies' physical resources and expertise, which are usually more state-of-the-art than those found in most universities;
- receive professional and financial support, and generate additional incomes;
- transfer fundamental and applied research results;
- raise the profile of universities within the region or the country, or even on the international scene.

What, then, are the advantages of cooperation for enterprises?

They can:

- invest in human capital;

- generate goodwill and a positive image;
- influence the relevance of education and training through curriculum innovation, design new research and study programmes, and promote the creation of university programmes for new occupations;
- increase the work experience of students, and recruit graduates who are better adapted to the world of work;
- introduce innovation in companies, in the form of new or improved processes, new products, new strategy, market development and improved competitiveness;
- deal better with technological changes, receive information on recent developments in science and technology, have direct access to research results, and turn these results into marketable products.

4.2 The forces that influence cooperation

From earlier Tempus research, and from experience with university–enterprise cooperation elsewhere in the world, a number of forces that influence such cooperation can be distilled. Some of these are external forces, such as global developments, while others are inherent to the nature of higher education or enterprises.

These forces can present themselves as drivers or inhibitors. Drivers work as catalysts, prompting or speeding up the development of cooperation. Inhibitors work as obstacles, impeding or slowing down cooperation efforts.

University–enterprise cooperation is no basic science. The following list must therefore not be assumed to be complete. It simply tries to bring order to what by many is experienced as a daunting chaos of implications and complications.

Technological advancement

Technological advancement is one of the most obvious driving forces behind university–enterprise cooperation. It is also the one on which the majority of successful Tempus examples of university–enterprise cooperation in the current partner countries build.

High-tech industry needs universities, if only for its students. Enterprises in a knowledge society, who must increasingly view human resources as some of their key raw materials, cannot ignore universities. And universities who train more students than they need for the next generation of academic faculty cannot ignore enterprises.

Peer support

A 2002 Tempus project* helped Moldovan universities to develop entrepreneurial activities and to strengthen their capacity to engage in technology transfer activities.

Rather than going it alone, the academic partners in this project involved all Moldovan stakeholders from the outset: government, education and business. To add credibility to the process for all the participating Moldovan partners, EU peers were also involved for all parties: EU policy makers coached the Moldovan authorities, and EU universities supported their Moldovan peers together with St Petersburg's Electrotechnical University, which had long-standing experience in this field.

The project became a success story from a Moldovan perspective as it managed, within two years, to set up a fully functioning technology transfer centre with specialised staff at the Moldovan State University and an incubator that immediately spawned several companies. Two other Moldovan higher education institutions became so convinced of the approach that they invested in their own incubators.

Of course one factor contributing to the success was the support from not only EU but also Russian universities whose situation, although distinctly different from that of Moldovan universities, shares some similarities that make for useful peer learning. But a crucial element was also the cooperation between policy makers from the State Chancery of the Saarland, the Moldovan Ministry of the Economy and the Supreme Council for Science and Technology, which made the concept of technology transfer in the framework of regional development much more credible to the Moldovan partners.

**The Tempus project: Promoting entrepreneurial activities and technology transfer in the system of higher education of the Republic of Moldova. (JEP 23194-2002)*

Globalisation

Globalisation is also a driving force. It puts new demands on the core skills – communication, numeracy, problem solving, IT and cooperation – of all individuals, both as citizens and as workers.

The importance of language skills has soared in recent years, leading to a demand for training from the world of work.

Exposure to tougher international competition forces companies to review their management, marketing and production strategies. This has changed the demands on new graduates, continues to change the demand on new graduates and will continue to do so in the future, as change has become a static feature of our environment. Any university that, again, trains more students than it needs for its next generation of faculty must keep

pace with changes that are often detected first in the world of work. Therefore cooperation with enterprises is essential.

Labour market needs

Labour market needs are also a driver. They follow in part from what is described above under technological advancement and globalisation; however, not all labour market change stems from technological advancement or globalisation.

Changing labour market needs can, for example, be the result of local development from an emphasis on one sector towards an emphasis on another: for example from heavy industry to services, from agriculture to tourism. Including a selection of local enterprises in a local partnership for training development may not be sufficient to anticipate such changes in local development. Companies in the declining sector will have difficulty accepting its decline, while the advancing sector will be too busy establishing itself beyond mere survival to acknowledge its training needs. To anticipate such change, broader partnerships are needed that include a variety of social partners and umbrella organisations, such as chambers of commerce or labour offices, as well as local or regional authorities.

Fundación Universida–Empresa Madrid

Madrid's Fundación Universida–Empresa (University–Enterprise Foundation) is an example of what a coordinated effort to draw together education and business can achieve.

Rather ahead of its time, it was established in 1973 as a private, non-profit initiative of the Madrid Chamber of Commerce and Industry and three of the city's universities to promote university–industry relations in training, employment and innovation.

It set out largely as a mediating agent between graduates and businesses but has taken on new roles as the importance of university–enterprise cooperation has increased.

Today it handles 50 research contracts annually and runs a programme that makes the technological expertise of university departments known to the world of business. It represents a staggering 50,000 SMEs.

The formula has now spread across the whole of Spain.

Academic culture

Academic culture is often an inhibiting force. Progressive in its pursuits, academia tends to be conservative in its traditions. This is partly because limited access has always given an

elitist element to academia. It is also because the world of learning has, quite justifiably, always been extremely protective of its independence and thus distrustful towards any outside interference. Finally, typical education spending patterns show that, even today, higher education is privileged in comparison with other forms of education¹⁵. It is therefore not difficult to understand that the forces of change sometimes have difficulty finding a foothold in academia.

In the context of this publication, however, it is difficult to quantify the inhibiting nature of academic culture. This is simply because academic culture is quite different across the current Tempus regions. In North Africa and the Middle East, universities are modelled on the traditional universities of former colonial powers. In the case of Morocco, Algeria and Tunisia, this means French universities of the 1960s. The universities of many countries in the Middle East are built following an English blueprint. The universities of Central Asia are Soviet developments of the German Humboldtian universities.

On this latter note, Tempus experience in the new EU member states of Central and Eastern Europe has shown that in former communist transition countries academic culture is often a doubly inhibiting force because of the traditional separation of research and teaching. Many universities used their newly granted academic freedom to regain some of the activities (and earmarked funds) they had lost to the national academies of science. Their first reaction to transition was to take a step back in time, recomposing themselves into the role they had been denied for decades. The classical universities in particular therefore tended to be particularly unwilling to adopt new policies.

¹⁵ Average annual spending per student in OECD countries (2003): primary: USD 5,450; secondary: USD 6,962; tertiary: USD 11,254. The latter is the average figure for the whole of tertiary education; spending on academic higher education (ISCED 5A) tends to be significantly higher than spending on professional higher education (ISCED 5B). Source: *Education at a Glance*, OECD (2006). In poorer countries the differences tend to be even greater. The joint UNESCO–OECD study *Financing Education – Investments and Returns* (2002) quoted the corresponding averages for 19 middle-income countries in 1999: primary: USD 797; secondary: USD 1,127; tertiary: USD 5,200.

Convincing arguments

Tempus partners in a 1999 project in the fields of tourism and hospitality in Kyrgyzstan found that education in Central Asia was out of touch with business reality, to the extent that it hampered the employability of graduates and possibly even tourism development in Central Asia as a whole.

In a 2002 follow up project*, EU partners in Belgium, the UK, Finland and Italy joined forces with colleagues in Kyrgyzstan, Mongolia and Uzbekistan to improve the collective hospitality curricula in these three countries.

They brought in the industrial partners from the outset, not only to provide input into the new curriculum but also to help convince reluctant academics that their education was no longer appropriate. The latter was achieved through a survey that yielded hard but convincing criticism from professionals in the field: teachers lacked sufficient industry background, education was too theoretical, some subjects were wholly irrelevant and economic subjects were still rooted in Soviet theory.

Platforms were established to develop and, importantly, maintain contact, professionals from the field were invited to teach sub-courses, cross-border cooperation was established to support peer learning and today, the countries involved enjoy a brand new four-year modular Bachelor's programme in tourism and hospitality taught at institutions throughout the countries and fully accredited by their authorities.

**The Tempus project: Tourism and Hospitality Studies in Central Asia. (JEP 23027-2002)*

Funding

Money can be a driver as well as an inhibitor.

Everywhere mass access has led to dwindling budgets as calculated per student. And everywhere dwindling funds have driven universities to seek novel ways of compensating for budget deficits. Forced in this way to look beyond public funding, many higher education institutions have been successful in securing additional core funding through commercial contracts with business partners. In such cases, money has been a driving force.

In order to entice enterprises into closer cooperation with universities, tax incentives and different forms of seed money can also be effective drivers. This holds particularly true in situations where the business environment is so hard pressed financially that it cannot afford even minimal expenditure on training.

It is important to note, however, the delicate line that separates money as a driving force and money as an obstacle. The Tempus report on which this publication builds showed that many universities argued that they had not developed contacts with enterprises because

they had no money to do so. In other words, they claimed that (a lack of) money was obstructing such developments. It is unclear whether this is a result of emerging donor dependency or an incomplete understanding of what university–enterprise cooperation entails.

Needless to say, if university–enterprise cooperation becomes entirely dependent on donor funding, its chances of surviving beyond the project stage are slim.

The Carnot Label

By 2010, the European Commission wants EU member states' research and development spending to be up at 3%, with two-thirds of this funded from private sources. Only a handful of countries have achieved that target today, and few of the others are yet on track to reach it by 2010.

The French are now trying to pump up private–sector funding by offering public research facilities financial incentives if they successfully engage in joint research with private partners – preferably companies, and ideally SMEs.

The initiative will grant successful centres the 'Carnot' label (after the French 18th century scientist Sadi Carnot, whose theory of thermodynamics came about through his interest in industrial problems). It is modelled on the German network of public–private–funded Fraunhofer research institutes.

The label is awarded, importantly, to public research organisations that conduct *both* theoretical research (to update their scientific and technological skills) *and* joint research with enterprises.

The first call launched in 2005 resulted in 67 applications, 20 of which were selected in 2006 to receive support from the Agence Nationale de la Recherche (ANR) amounting to a total of EUR 40 million. The support will allow them to reinforce their basic research activities in parallel with the research they conduct jointly with industry.

Institutional management

Mass access requires strong administrative procedures. During the student boom in Western Europe these were taken on by new administrative directorates operating alongside academic rectorates. They had a far more business-minded approach than the scholars and scientists with whom they worked, and thus allowed entrepreneurship into academia through the back door.

Successful long-term partnerships between universities and enterprises depend on the university management's willingness to develop a new vision and introduce new core tasks. University management needs to allow the necessary flexibility required for the execution of cooperation projects. There are often time constraints as a result of the heavy workload of teaching and research staff.

Before embarking on cooperation activities, universities, like any large organisation, need to have a clear strategic orientation on what they expect from their cooperation with the world of work. They need to define a mission and objectives, and the activities that are required to achieve these objectives, and to identify the resources available. A thorough market analysis might be needed in order to define the types of structure to be set up, the types of cooperation to be selected, and the fields in which the university excels. Work plans and business plans might also be useful tools.

Facilitating power

The focus on academic independence during the first years of transition in Central and Eastern Europe often led to unbridled autonomy for deans and their faculty, and left the less self-motivated rectors entirely out of the picture. It could even leave them out of money, as in a number of countries the deans negotiated their budgets directly with the ministries.

It therefore goes as proof of the facilitating potential of a strong university management that, without a penny to spend, some managed to steer their universities off the beaten track into novel and sometimes controversial territory.

The most convincing examples were regional universities that had little traditional academic prestige to defend and could focus on innovation. How successful they could be in defying the odds and showing the way forward has been amply demonstrated by universities such as those at Maribor, Cluj-Napoca and Kaunas.

Education policy and legislation

Education policy has the *potential* to drive university–enterprise cooperation. Unfortunately, however, in practice it is rarely a catalyst and is sometimes even an obstacle. European and North American experience shows that legislation in this field tends to follow practice. In past decades there have been numerous examples of higher education institutions bending rigid rules to accommodate entrepreneurial activity until whatever practice they engaged in became so widespread that authorities were forced to amend legislation in order to avoid criminalising their whole higher education sector¹⁶.

Yet, obviously, policy and legislation can be powerful facilitators. Simply allowing universities to raise funds on a commercial basis – be it through limited tuition fees or commercial research or consulting contracts – can be a strong impetus, as can offering incentives to industry for cooperating more closely with universities.

¹⁶ A good example of this has been the explosive trade in Master's degrees from non-academic tertiary institutions in countries where 'Master's' was not a protected academic title. They were not allowed to offer postgraduate courses and issue the equivalent national degree, so they offered postgraduate courses and used the English expression 'Master's' for them.

Authorities can also use their powers of publicity to raise awareness, though in young democracies academia will typically be too concerned with its newly won independence for any stimuli from the authorities to have any effect. The relationship between authorities and society in transition countries is quite different from that in established democracies, and indeed examples exist where government interference has been directly counterproductive.

As mentioned in the section on funding, authorities can influence cooperation with financial incentives. Tax breaks have already been mentioned, but seed funding can also be provided. Another option that has been used frequently by authorities in Europe is the principle of matching funding, where part of the funding for higher education is provided as a lump sum on the basis of an agreed formula, while additional funding can be earned on certain conditions. With matching funding, authorities promise to match generated funds from projects or commercial contracts with a set percentage of public funding.

Early legislation

In the United States it took the so-called *Bayh-Dole Act* to make earning money from research a legal affair for universities. This piece of legislation was adopted in 1980. Most European countries have only very recently adopted similar laws and procedures.

The *Bayh-Dole Act* was unprecedented in that it allowed US universities to own, license and market their faculty research. As a result, innovation has increasingly shifted back to the universities, creating new roles for them as engines of economic development, and shifting commercially viable research away from corporate laboratories and back to campuses.

4.3 The shape of cooperation

Each university has its own views on the type of cooperation that can be envisaged with enterprises, and there is no unique model for such cooperation. The shape of cooperation depends on its objectives, the local environment and the university's capacity. In addition to internships, as mentioned in the introduction, other types of cooperation have been tested in different countries. Some of these are listed below:

- involving enterprises in developing new curricula that are more in line with the needs of the labour market; developing project-based curricula;
- setting up a university board with the participation of enterprises, and involving university staff in entrepreneurial activities;
- offering scholarships that favour studies with industrial cooperation;

- organising open days and exhibitions to attract local entrepreneurs, or fairs during which companies introduce themselves and establish closer contacts with candidates for jobs;
- keeping in contact with former students and using these contacts to develop closer relations with the enterprises where they are employed;
- setting up enterprise link units to facilitate contact with enterprises;
- setting up centres of excellence for university–enterprise cooperation that serve as catalysts for wider cooperation;
- setting up career services assisting graduates to find jobs, and organising workshops on employment opportunities;
- preparing and presenting joint lectures with colleagues from enterprises;
- offering enterprise personnel secondments to universities;
- developing continuing training programmes for staff from enterprises;
- developing industrial attachments and consultancy assignments;
- setting up agricultural extension services on land owned by universities;
- transferring the results of research to the development of enterprises and development projects;
- setting up joint companies or science parks that aim to exploit new techniques and technologies, and the commercial application of research findings.

A lasting experience

In 1995 St Petersburg Polytechnic University in Northwest Russia stood at a crossroads. Developing links with industrial partners was becoming increasingly difficult because traditional partners had always been large enterprises, and fewer and fewer of these remained.

The university then entered a Tempus consortium that helped it to radically review the way it dealt with its environment. Through the project 'University–industry linkage with regional impact*', the university developed new strategies, approaches and basic materials that would lay the foundations on which it still runs its cooperation with its many industrial partners today.

Although the project finished seven years ago, staff in St Petersburg have remained in posts related to the subject. They still work together with their EU counterparts on joint initiatives and on further developing the networks they created in the mid-1990s.

Since then the university has come to play a pivotal role in external linkages in the region. It regularly publishes information sheets for industrial partners with innovative tools and the fruits of its own work that are ready for industrial use. But its activities today extend well beyond the boundaries of technology. It has, for example, been a prominent partner in the Russian presidential management training programme and has set up an innovation institute that operates as a consulting agency providing restructuring advice to companies in the region.

**The Tempus project: University–industry linkage with regional impact. (JEP 10053-1995)*

5. The state of affairs in Tempus partner countries

5.1 Similar needs – different starting positions

Developing partnerships with enterprises speeds up innovation and supports the continuous enrichment of knowledge and skills. This chapter illustrates how countries in North Africa, the Middle East, the Western Balkans, Eastern Europe and Central Asia are dealing with the issue of cooperation between universities and enterprises. Examples are taken from Tempus projects across the different regions covered by the programme.

In the current Tempus partner countries, as elsewhere in the world, enterprises need graduates who can combine good professional knowledge with the social skills that are required in a professional environment. Companies often complain that university curricula are too theoretical, too academic and insufficiently oriented towards professional practice and experience. They look for graduates with good life skills, such as communication skills, team-working abilities, leadership skills, reliability, creativity, commitment, problem-solving skills, negotiation and decision-making skills, independent learning skills and flexibility. Closer cooperation between universities and enterprises can help students to develop these skills.

If universities in Europe still need to further develop a modern perception of their role and mission, this is even more the case in the current Tempus countries. The prevailing view is that the universities' main task is restricted to traditional teaching and scientific research.

In reality, there is a rapidly growing need for highly qualified people to meet the rapidly changing requirements of the labour market. These people can only be educated in higher education.

Employers are generally not involved in the definition of higher education programmes, and most universities in Tempus partner countries need to develop the entrepreneurial spirit and motivation necessary to take up new partnership projects. The mechanisms that will ensure the relevance of higher education to labour market needs still need to be developed. Higher education programmes must prepare students for lifelong learning, and provide them with the skills that will help them to cope with future changes. In order to be able to respond flexibly to emerging demands, universities need to be in constant dialogue with the labour market.

When cooperation does take place in Tempus partner countries, it is usually with large enterprises and industries because these have a critical mass of qualified staff who can find a common language with teachers and researchers, they have better equipment and

infrastructure, longer-term strategies and more money. SMEs are less attractive to universities since they tend not to have the same long-term perspective. They usually look for immediate practical solutions and provide low financial rewards. There is, however, a case for arguing that in Tempus partner countries, universities should pay more attention to cooperation with SMEs, since these are interesting for their high level of adaptability to change, their entrepreneurial spirit and their great potential to create new jobs.

5.2 Survey results

The underlying assumption for the survey was that university–enterprise cooperation had not developed sufficiently to be able to contribute to economic growth in the Tempus regions. From this starting point the questionnaires addressed gaps in the macro-economic environment and the support structures for university–enterprise cooperation. Furthermore, the potential for improved employability and innovation were identified through the survey.

The description of the situation of university–enterprise cooperation comes from the main findings of the questionnaires and field visits. It applies to all three of the current Tempus regions: the Mediterranean region, Eastern Europe and Central Asia, and the Western Balkans. While there are differences between and within the regions, the analysis and recommendations focus on common issues that need to be addressed. The recommendations are supported by interesting ideas, strategies and examples of good practice from the regions.

In general, university–enterprise cooperation is still in its infancy in the regions surveyed. There is little regular dialogue between universities and enterprises, and indeed they often appear not to understand each other at all because of their different institutional cultures. However, examples of good practice can be found everywhere and many of these were initiated with Tempus support.

While all the regions have expressed a general interest in university–enterprise cooperation and agree that it needs to be stimulated within a long-term context, institutional support structures and platforms for supporting knowledge and technology transfer are absent.

Present economic situation

The current weak economic situation in the regions, and in particular the problems faced by their industries – trying to recover or to survive – are perceived as an important obstacle for university–enterprise cooperation. Partners in the Mediterranean region and Eastern Europe and Central Asia confirm the difficult situation, but also highlight opportunities. Representatives from the Western Balkans seem more pessimistic. However, the promising future economic growth rates in the countries concerned and the subsequent demand for highly qualified staff are likely to improve the further potential for university–enterprise cooperation.

Making the university indispensable

A Tempus project* in Bosnia and Herzegovina has helped universities to move into a key position as intermediaries between the legislator and the country's important food industry.

The principal aim of the project was simple: to pull together all know-how about EU food safety regulations within the country's universities, and then to pass on this knowledge to the food industry through training.

The spin-offs, however, were greater than anyone had foreseen. Twenty professors from the universities of Mostar, Sarajevo and Tuzla went to the EU and collected materials for eleven teaching modules. Back home they organised seminars with industry representatives. The demand was high, not only from within the country but also from throughout the Balkans and as far afield as Georgia and even Belgium.

The contacts developed with industry were lasting, as were contacts with EU partners and institutions. The textbooks that were developed were in great demand when the start of negotiations approached and knowledge of EU food safety regulations became a must for every professional in the field. At each participating faculty one centre for permanent education and one for technology transfer were established.

Perhaps most importantly, the participating universities learned how different the process of educating professionals is from that of educating students and how, in an impoverished environment, they can use their knowledge to the benefit of the country's development. They retained their key roles as knowledge centres. And even if fees do not cover the cost, providing essential training to a large target audience makes superfluous the steady flow of expensive Western European consultants.

**The Tempus project: EU food law – Bridge among university and industry. (JEP 16140-2001)*

National legislation, policies and strategies

There are a variety of policies in the fields of human resources, research and innovation, and industrial sectors that include references to university–enterprise cooperation. However, they seem vague and inefficient, and support for cooperation is absent. Access to good practice is non-existent, and structures for dialogue between national and local authorities are limited.

Universities have policy statements that mention the need to cooperate with enterprises, particularly in the framework of the Tempus programme, but little is done in terms of actual implementation. Similarly, enterprises have included cooperation with universities in their mission statements.

Unfortunately the data and information received from the countries do not allow an in-depth assessment of the key elements of policies and strategies for increased university–enterprise cooperation. The obstacles that are mentioned relate to salaries and insurance during sabbatical leave (for example when a teacher goes to work for an enterprise for a limited period of time, or when an enterprise employee teaches at a university), or to the legal status of university–enterprise structures and platforms which support knowledge and technology transfer (i.e. technology parks, technology transfer centres, business incubators and continuing training centres). Efficient legal and policy arrangements that provide a sound and supportive environment for university–enterprise cooperation do not yet seem to have been established.

Policy support

The following initiatives to support university–enterprise cooperation through legislation, policies and strategies were identified in the regions.

- In the Mediterranean region there are laws that refer to university–enterprise cooperation, such as Law Nr 98–11 in Algeria; the Support Programme Promoting University–Industry Common Research Centres and the Development Regions Law in Turkey; or the Environmental Law, Energy and Electricity Codes in Egypt. In Egypt the Supreme Council acts as an accreditation authority for public and private institutions and includes both university and enterprise representatives.
- In the Russian Federation there are national programmes to foster research and development, integration and innovation. There are also ideas to design a national plan for scientific–industrial centres and large sector-oriented technology parks. In the Russian Federation and Ukraine there are laws on higher education and research that mention university–enterprise cooperation.
- In Azerbaijan the law on education and overall education reform includes university–enterprise cooperation. In Mongolia there is a reference to university–enterprise cooperation in education and labour laws. Furthermore, a master plan for the development of science and technology is mentioned.
- In the Western Balkans, where all countries have signed the Bologna Declaration, discussions are underway on the implications of the Bologna Process on national legislation. However, no obvious link with university–enterprise cooperation is mentioned. In the former Yugoslav Republic of Macedonia and in Serbia and Montenegro a new national strategy for education and a new law on education including university–enterprise cooperation are being prepared.

National fiscal rules and regulations

The fiscal rules and regulations in place are assessed as favourable to university–enterprise cooperation in 35% of the answers from the Mediterranean region, in about 15% of those from Eastern Europe and Central Asia and in only 5% from the Western Balkans. They include indirect support through tax relief or direct grants in the form of payments and contributions in kind (i.e. provision of equipment or new technologies for teaching and learning). However, further incentives and support have been requested, with particular reference to favourable taxation to stimulate joint university–enterprise initiatives.

While the survey responses do not allow an assessment of the efficiency of the measures that are in place or underway, there is a consensus that efforts are being made in all the regions to increase university–enterprise cooperation.

Tax breaks

In all regions there are examples of tax incentives supporting university–enterprise cooperation.

- In Lebanon the fiscal rules of the Ministry of Tourism foster university–enterprise cooperation. In Egypt donations can be deducted from taxes, but many procedures must be completed, and this may reduce the number of requests. In Jordan there is a government-funded body to encourage cooperation between industry and universities, although its efficiency is questionable.
- In the Russian Federation the parliament offers tax exemptions for enterprises that sponsor non-profit activities. In Belarus there are favourable regulations regarding the creation of science parks. In Uzbekistan a specific law has been passed to stimulate individuals and legal entities to invest in scientific research activities.
- In the former Yugoslav Republic of Macedonia there are tax reductions for donations of teaching and learning equipment, including computers and overhead projectors. In Serbia and Montenegro there is a certain ceiling below which a donation can be received tax-free.

Overall financial support

The lack of funds is identified as a threat for university–enterprise cooperation, and the support that is provided comes mainly from the EU. The financial support mentioned in the summary report includes grants for students and the financing/cofinancing of academic chairs; the provision of premises, equipment, human resources, management time, and software; the facilitation of university retail services (such as products and processes developed by the universities); and the creation of alumni organisations.

The negative assessment of the funding situation is based in particular on the analysis of replies from the National Tempus Offices. All of these highlight funding issues in Eastern Europe and Central Asia, the Western Balkans and in particular the Mediterranean region.

Their assessment is confirmed by enterprises and universities. They express anxiety regarding the future sustainability of Tempus initiatives and other donor-supported programmes. Partners hope for further support from the EU, other international donors and their governments, as the time allowed to become self-sufficient is often considered too short.

Rationale for university–enterprise cooperation and common interests

The survey results show that universities and enterprises each operate in their own field and work according to their own rationale. There is little awareness of the mutual benefits of cooperation.

Enterprises want short-term success on the market and are open to cooperation with universities in order to have access to potential future employees. They are also interested in know-how and expert knowledge on innovative products and processes. Universities are much more oriented to the long term, and are interested in innovative teaching and research in general. They have little entrepreneurial spirit, as their institutional environment does not require it.

Universities

Universities are often considered to be overly inward-looking, with little contact with the outside world. However, the summary report identified some areas of common interest for cooperation and the need for regular dialogue and common support structures and platforms. Major drivers for university–enterprise cooperation include the need to transfer knowledge and technology and the need to recruit adequate human resources to be competitive and innovative in a global economy. The joint development of education and training for the labour market – promoting employability – is of common interest.

Technical universities are usually eager to cooperate with enterprises. This is a result of their traditional links in applied research and also of the need for student placement posts. Classical universities appear more reluctant. Universities consider SMEs to be the most relevant and interested partners for cooperation simply because industry in the region is dominated by SMEs. However, the reality shows that actual cooperation takes place with large companies – often branches of multinationals – which have proven experience in cooperating with universities. Micro-enterprises and the informal sector are also considered potential partners.

Despite efforts to formalise relationships, personal contacts rather than institutional policies seem to have been the best guarantee for success and sustainability of projects up to now. Cooperation has had little impact on the institution as a whole. There are few support structures and platforms, and little dissemination of good practice for cooperation between universities and enterprises. Aggravating the situation are the relatively strong autonomy of faculties and the weak cooperation between them.

Securing support

As Morocco prepares for its free-trade agreement with the European Union in 2010, industrial security is quickly becoming an important issue for companies in the country. International competition and access to new markets mean that Moroccan industrial standards will be scrutinised by overseas clients.

The Ecole Mohammadia d'Ingénieurs (EMI) of the University Mohammed V in Rabat has long seen this coming but never quite managed to secure the resources it needed to develop quality courses in this field with sufficient international support. In 2003, Tempus* brought an opportunity to lift the project from the drawing board into reality.

With the help of counterparts in Nancy, Valencia, Angers and Paris, the university has developed a master's level programme in industrial security. Industrial partners in the project provide such prominent experts as can be found at the Belgian Centre d'Étude de l'Énergie Nucléaire and its Moroccan counterpart, the Centre National de l'Énergie, des Sciences et des Techniques Nucléaires. Even the Moroccan Gendarmerie Royale is involved.

The first 20 engineering students have enrolled and perhaps more importantly, an elaborate trainer-training programme has been launched in which twenty high level representatives from Moroccan companies take part, side-by-side with ten of EMI's teaching staff. They both learn and teach, while the industrial partners offer traineeships and play a key role in the evaluation of students.

The strength of this particular project is the way in which it shares its benefits among academic and industrial partners. Although this is a general aim of university-enterprise cooperation under Tempus, it has proven hard to fully achieve elsewhere. In fact, according to the Moroccan NTO which does the local project monitoring, the impact of this project is even more profound at the participating companies than at the university.

**The Tempus project: Formation au Maroc en Sûreté Industrielle. (JEP 31079-2003)*

Enterprises

Enterprises usually contact universities with an applied science profile, in particular engineering sciences, followed by business and management, agriculture and horticulture, and medicine and pharmacy. Research contacts are frequently mentioned as a common area for cooperation. In some cases private industries also intend to set up training centres within regions in order to reach students and offer lifelong learning courses and programmes which may also lead to degrees. Most enterprise contacts seem limited to those study areas that are in high demand. However, these findings have to be considered carefully, as the enterprises involved in the survey are mainly set up by university professors as an additional source of income.

Local partnership

Local partnership in all the regions appears very weak and there seems to be little interest in pursuing the common interests of universities and enterprises. There are examples of common discussion forums and other forms of information exchange, but no institutionalised or regular platforms exist. While some chambers of commerce and local administrations are involved in cooperation projects, they do not broker links between universities and enterprises. Universities find it difficult to attract social partners, who do not consider university–enterprise cooperation a part of their portfolio. No initiatives aimed at starting a lasting dialogue could be found. However, the future involvement of social partners in defining the needs of industries and regions and recommendations for the training of employees is recognised as essential.

Joint activities of universities and enterprises

The Tempus summary report identified three modes of university–enterprise cooperation that were observed throughout the three regions. These were the establishment of cooperation platforms, joint curriculum development, and mobility.

They cover the following activities.

1. Support structures and platforms

- participation in governing boards of enterprises and universities;
- participation in recruitment committees in enterprises;
- establishment of career service offices at universities;
- establishment of technology transfer centres;
- establishment of continuing training/lifelong learning centres;
- locating business incubators at universities;
- start-up of new joint enterprises.

2. Curriculum development

- joint analysis of training needs;
- joint development of teaching and learning modules;
- joint education and training projects;
- programme to develop entrepreneurship.

Rehabilitating defects

University-enterprise cooperation need not always be about the valorisation of academic interests. Enterprises can encompass the entire world of work, including NGOs and public services. The principle of 'staying in touch' with those that will make use of your studies is the same and broadly applicable.

This was excellently exemplified by the University of Skopje and its Institute of Special Education and Rehabilitation. Its name change – from the Institute of Defectology – clearly illustrated the aims it pursued. It wanted to move special education in the former Yugoslav Republic of Macedonia from segregation towards an inclusion.

Through exchanges of students, professors, experts and local authorities; through workshops and seminars, training in the EU and on the job training in the former Yugoslav Republic of Macedonia; through annual conferences, publications, a website, an e-learning environment; and finally through an assessment by an international multidisciplinary group of university professors it achieved its ambitious goal. It developed and introduced a brand new curriculum and created an Early Intervention Centre. In close collaboration with practicing institutions it adopted new educational and rehabilitation principles that make special education more inclusive.

Interaction with the schools, the teachers, institutes and care givers has been reinforced. The Early Intervention Centre is part of the university's Health Care Centre. It has its own premises where students can actively practice, interacting with parents and children.

Besides relations with the Government, the project also intensified relations with the Inter Political Parliament Lobby Group for the Support of Handicapped Persons in Society and topics of the project have been introduced into the work of the Lobby Group. The Group has developed a wide and intensive international network.

The tremendously broad base of partnerships helped the university realise its aims. Today in the former Yugoslav Republic of Macedonia this project is seen as an example of best practice in reforming education for a multicultural civil society.

**The Tempus project: IN FOCUS. (JEP 16012-2001)*

3. Mobility

- exchange of staff between universities and enterprises;
- sabbatical leave for university staff in enterprises and vice versa;
- joint research.

The Tempus summary report found these to be the current university–enterprise cooperation activities in the Tempus partner regions. Other opportunities and options have not yet been fully exploited. Cooperation seems to be based on loose connections, while more advanced cooperation models require more regular and structured dialogue and cooperation. Survey respondents from all regions expressed an interest in further developing the activities mentioned in order to strengthen economic development and increase employability.

Ambitious visions

Higher education in Serbia and Montenegro is not yet quite ready to satisfy the needs of a high-tech industry. Although Vojvodina is the most developed part of Serbia, its environment is focused on traditional industries and agriculture. The University of Novi Sad, however, will not sit and wait while the region might, or might not, develop a high-tech industry. It will develop its own.

The university fully recognises the need to establish a stable means of knowledge transfer to industry. It has started a long-term transformation process aimed at diversifying its curricula, introducing interdisciplinary courses and opening itself to research and development possibilities linked to local and global industrial needs. But with the full support of the regional authorities, it wants to go much further. It wants to develop a fully fledged science and technology park – a geographic concentration of interconnected, competing and cooperating companies, suppliers, service providers and associated institutions.

It is envisaged that once fully developed, the Science & Technology Park Novi Sad will incorporate a technology transfer centre, a business incubator, a venture capital fund, contract research organisations, a liaison office, a school of entrepreneurship, funds to support business ideas, a centre of intellectual property, laboratories, continuing education centres, a business networking organisation, conference rooms, consultancy agencies, offices for new start-ups and building space for larger companies.

EU partner universities are helping the university to realise its ambitious aims through two projects. The first, supported by a Tempus grant*, will define the legal and organisational framework of the park and establish the services necessary for a sustainable technology transfer centre – a consulting service for researchers engaged in technology-oriented projects, who will, for example, investigate the market potential of developed products and provide intellectual property management services. The second, the Incubation Centre, supported by Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), a German agency for technical cooperation, is aimed at training the staff of the future business incubator.

**The Tempus project: University science park – organisational framework. (JEP 16090-2001)*

Support structures and platforms

The Tempus survey revealed that pilot technology transfer centres and other structures supporting the transfer of knowledge and technology between universities and enterprises have been set up in all regions.

In Eastern Europe and Central Asia, 30% of the universities and enterprises questioned are currently active in (the development of) technology transfer centres, and almost half of them showed an interest in developing technology parks. In the Western Balkans there is active university involvement in the creation of technology transfer centres with around 40% participation. While the initiative to set up support structures is usually initiated by universities, partly stimulated by the Tempus programme and similar EU developments, in the Mediterranean region, enterprises are also involved in their establishment.

Curriculum development

Another activity with clear mutual benefit is the joint development of courses and curricula to ensure their relevance to the needs of the labour market. Jointly developed programmes can improve the employability of students. But joint curriculum development activities should also include initial education and short training courses for the workforce. They might include joint training needs analyses, curriculum design and even implementation. Student placements can also be included. Generally, because of the protective nature of legislation governing university accreditation, new curricula are considered to be pilot projects. Often, therefore, they do not form part of the overall acknowledged university curriculum. They need to be accredited by the university or sometimes even by other authorities to become part of the regular studies, and this can be a time-consuming process. In all regions it became evident that accreditation procedures hamper curricular innovation. This was even more the case at graduate level than at any other level.

Good practice in Tempus: support structures and platforms

Good examples of support structures and platforms developed through Tempus and identified in the Tempus summary report include:

- business start-ups in Kosovo, a continuing training centre for cultural heritage in Egypt, technology transfer centres in chemical and textile engineering in Egypt and the former Yugoslav Republic of Macedonia, industry liaison offices in Uzbekistan, transfer of technology, know-how and consultancy services in Egypt, Lebanon, the Russian Federation, and Serbia and Montenegro, and a student service to establish and sustain contacts with enterprises in Azerbaijan;
- development of guidelines to improve cooperation and partnership agreements in Lebanon and Serbia and Montenegro;
- software to facilitate access to jobs in Kosovo;
- special support programmes for SMEs in Moldova and Uzbekistan.

Sectors in which curricular cooperation took place included health and pharmaceuticals, hospitality and tourism, engineering, chemistry, textiles and food safety.

Good practice in Tempus: curriculum development

Examples of good practice in joint curriculum development identified by the summary report in the Tempus programme include:

- curriculum development projects in Bosnia and Herzegovina, Egypt, Lebanon, the Russian Federation, and Serbia and Montenegro in subject areas such as EU industrial property law and EU food regulations;
- specific training programmes for particular needs of industry, such as phytopharmacy in Egypt, and environmental technology and risk analysis in Azerbaijan and Egypt;
- train-the-trainer curricula programmes for school and university teachers, civil servants, NGO representatives and journalists in Kosovo, the former Yugoslav Republic of Macedonia, and Uzbekistan.

Although promising examples were found throughout the regions, in practice initiatives often run into difficulties in the planning stage. This is blamed on the high workload of partners involved and the shortage of human resources to implement activities. Moreover, scarce financial resources mean that equipment at universities and enterprises is often too old to allow for the implementation of innovative curricula.

Yet by and large these activities have led to a general improvement of the suitability of curricula for the labour market. This was confirmed by a number of countries, including Azerbaijan, Bosnia and Herzegovina, Egypt, Jordan, Lebanon, the former Yugoslav Republic of Macedonia, Moldova, the Russian Federation, Tunisia, Uzbekistan, and Serbia and Montenegro. In addition, in some cases they have stimulated cooperation between sister faculties at different universities. This was the case in Bosnia and Herzegovina and in Serbia and Montenegro. Interdisciplinary approaches in postgraduate courses were also developed. Such activity can do much to overcome institutional fragmentation.

Mobility

With regard to mobility, 40% of institutions from Eastern Europe and Central Asia, 50% from the Mediterranean and 20% from the Western Balkans participate in at least one of the mobility activities mentioned, through staff exchanges, sabbaticals for work in another environment, or joint research. It is interesting to note that in the former communist countries such mobility between universities and enterprises was traditionally commonplace, but that it ceased during the transition process.

The analysis shows that mobility today is typically short term – often mere days – and largely driven by a desire to exchange research results. This leads to the conclusion that

this kind of cooperation is no longer extensively exploited. Individual student placements do not take place at all, other than as a part of curriculum development activities under the Tempus programme.

5.3 Key differences with the EU

The Tempus report identifies, albeit between the lines, a number of differences with the situation in EU member states. These are important to note and even highlight because obviously EU models (or examples from anywhere else in the world) cannot be indiscriminately copied into the context in which universities in the current Tempus regions operate.

Developing training with the trainees

The Supreme Council of Antiquities is part of the Egyptian Ministry of Culture and is responsible for the conservation, protection and regulation of all antiquities and archaeological excavations in Egypt.

Supported by Tempus, the University of Cairo has set up a training programme for members of this council. A team of cooperating institutions is helping it develop the skills it needs for its technicians, site managers and top managers.

Responsibilities have been clearly defined. The Department of Geological, Marine and Environmental Sciences of the University of Trieste has organised and delivered courses in geophysical methods and site management. The Ecole des Mines in Nancy has provided external experts for a course in new restoration strategies and for workshops in photogrammetry, soil and structural analysis and monitoring systems.

The University of Cairo is responsible for all academic tasks and activities during the workshops and courses. It organised a survey of current courses used by the Supreme Council of Antiquities and its actual needs.

Sustainability and future independence of EU trainers is safeguarded through a programme that trains Egyptian trainers not just in what to teach, but also in how to keep abreast of new developments in their field.

With the faculty staff training the people who best know what kind of training is needed most urgently, the quality and relevance of these courses should be top notch.

*The Tempus project: ATECH – Advanced Technology training programme for Cultural Heritage. (JEP 30049-2002)

Legislative frameworks in the current Tempus partner countries are generally more restrictive than they are in the EU. This is a problem for authorities to solve and thus requires their understanding of the urgency of the matter. With this understanding, and with access to good practice from around the globe, authorities in partner countries have

an edge. As mentioned earlier, in most of the OECD countries policy development and legislation followed practice in this field. Authorities in the current Tempus partner countries have a clear opportunity to take the lead in the process of bringing the worlds of work and education closer together.

Good practice in Tempus: mobility

Examples of good practice in mobility identified by the summary report in the Tempus programme include the following.

- In Syria students are encouraged to undertake a work placement in industry during the summer holidays.
- In Azerbaijan, Uzbekistan and Serbia and Montenegro student placements are used as a way of indirectly involving industry.
- In the Russian Federation and Serbia and Montenegro degree students are offered placements and research posts in technology centres, incubators and newly started companies in order to carry out their research for a doctoral degree.

For reasons mentioned in section 4.2, most of the universities in transition countries cling more to a traditional academic culture than do their European counterparts. To a lesser extent this also applies to the countries of North Africa and the Middle East. Convincing academics of the need to engage in closer collaboration with society at large may still require time and effort, but it can be accelerated with external support through a peer-to-peer programme such as Tempus.

Far more significant is the different nature of the business environment in the Tempus partner regions. The labour legacy in the transition countries is a crumbling blend of ineffective state industrial giants. The new economy is one of micro-enterprises. It is often a survival economy, with neither money nor time available to do more than what most urgently needs doing. What may be perceived as educational chit-chat is not usually considered to be one of these things. In many countries the grey or informal economy is responsible for a massive chunk of national employment. This has important implications for the type of activity that *can* serve as an initial interface between higher education and its economic environment. Business incubators might have a better chance of success than technology transfer centres.

In all this, however, the fact remains that the changes that are most urgently needed relate to such less tangible issues as perception, awareness and culture. Initial collaboration must be developed, and where experts in Europe and North America generally agree that it is the education sector that needs to take the lead in initiating such collaboration, it is not at all certain whether this holds true for all current Tempus countries. After all, university-enterprise cooperation in Europe and North America started as a means of generating extra funds from a wealthy source: industry. Only after that came initiatives that led to more structural collaboration such as board representation and employer input

in the definition of curricula and qualifications. In a world where industry is either non-existent or impoverished, financial gain will not be a great incentive for universities, and authorities might be in a better position to initiate cooperation. This needs further research or experimentation.

However, one thing is certain: once cooperation *is* initiated, broad university–industry partnerships can much more effectively tackle broad economic development and thus lay the foundations on which much more advanced collaboration can later be developed.

6. Recommendations

From the report a number of very clear recommendations appear. Most of these relate to building capacity and raising awareness.

Obstacles identified by the survey can be used to the benefit of cooperation development if they are tackled in partnership. The mere exercise of exploring areas of joint interest can on its own turn obstacles into opportunities.

Examples given in the preceding chapter can be used as a starting point for collective development if regional differences are taken properly into account.

Recommendations are grouped by the target they address: authorities, universities and enterprises.

6.1 Raising awareness

Authorities

The academic environment is likely to be worried about a possible diversion of energy and commitment of teaching staff interacting with enterprises, away from traditional teaching activities. There is therefore a need to raise awareness of the necessity to create more bridges between the worlds of work and education, as a way to reduce the mismatch between learning outcomes and the requirements of the labour market. Governments should work with employers and professional bodies to offer more work experience opportunities for students.

In order to inform the world at large, authorities should also initiate information campaigns for local administrations, social partners and employers' organisations. To this end they can tap into experience from EU member states to great advantage. They should give information on supportive legislation and fiscal rules where these exist. The roles and responsibilities of the respective institutions should be highlighted and their relevance for university–enterprise cooperation in the region discussed.

Social partners should also support and perhaps even demand closer cooperation between the worlds of work and education. They could develop a portfolio of activities similar to those in the EU, including joint training needs analyses, conferences to exchange views on needs and latest developments, and the inclusion of training demands in collective bargaining.

Universities and enterprises

Awareness-raising activities on the benefits of university-cooperation and the dissemination of good practice should be incorporated into university strategies and company business plans. Topics to be addressed might include:

- key employment skills for graduates;
- the importance of human resources development in the knowledge society;
- the benefits of joint training and research for competitiveness in a global market.

Examples of good cooperation practice should be shared. Experience from the EU should be made accessible. Measures might include:

- open days and discussion forums for colleagues across universities and enterprises;
- seminars to present joint education and training programmes;
- training for university and enterprise staff, for example in negotiating skills, legal issues, fiscal rules, good practice, and project management.

6.2 Regular and structured dialogue

Authorities

Authorities should promote the development of structured partnership platforms nationally and locally. Such platforms should include representatives from universities, enterprises, social partners and students, and should be established as a regular communication system that can anticipate developments and act proactively.

Authorities should stimulate the development and implementation of joint initiatives in training and research. Government policy should concentrate especially on involving SMEs and – in those countries where the grey economy is a substantial factor – on the difficult task of finding a way to involve the informal sector. Small enterprises could pool their resources and their needs with local partners.

Specific support structures, such as regional technology transfer centres or local business incubators, may have to be developed. Using existing EU models (such as innovation relay centres or regional university-enterprise training partnerships) as a basis for development can save time. It cannot be stressed enough in this context that developing effective social dialogue and partnership is a long-term investment.

Such tasks may seem daunting, and indeed governments in Tempus partner countries would have much to learn. Such policy learning should be part of much broader strategic development. The Tempus programme was not designed to support this kind of peer learning among authorities. It would need to accommodate this, or alternatively, policy learning could take place through other parts of the new EU support programmes. Authorities could be encouraged to engage in peer-to-peer models of policy learning that are used in the EU, such as the open method of coordination. Depending on the country and its relationship to the EU, this could be realised as an affiliation to existing EU processes or as a separate process among Tempus partner countries or groups of these.

Universities and enterprises

Universities and enterprises should try to use existing networks (such as Tempus networks) and institutions to promote cooperation, be it locally, regionally or sector-specific. For universities and enterprises the development of internal structures appears to be essential. Such structures could include, for example, liaison offices that serve as the first contact point for university–enterprise cooperation. The benefit of such structures is that anyone seeking support can easily identify where to go and whom to approach.

Large enterprises are likely to be in a position to set up such structures on their own, while multinationals can improve existing structures locally and provide examples of good practice. Companies could engage in benchmarking best practice in university–enterprise cooperation and share the results so that all companies can benefit from them. In this way, those providing benchmarks would have their methods tested and rated by peers from both universities and enterprises. Again, it might be worthwhile to study experience from EU universities and companies.

Groups of SMEs with similar sector, social or geographic profiles can set up joint structures for cooperation with universities. This can dramatically increase their competitiveness compared with larger enterprises. SMEs could pool their resources in terms of finances, employees, equipment and innovation capacity. This will make them more attractive partners for student placements or joint research with universities than any single SME could ever be.

6.3 Laws and strategies

Authorities

Authorities should consider university–enterprise cooperation as a strategic instrument of national innovation strategies and link this to economic, employment, education, training, and research and development strategies. The legal framework may need to be adapted to stimulate cooperation between universities and enterprises and perhaps even to allow higher education institutions to earn money in exchange for services.

It is recommended that education and training activities should be taxed more favourably, for both institutional and individual learners. For universities, tax relief might be granted when purchasing or selling learning materials. Financial incentives might include elements of a loan for students that may have to be paid back to the authorities some time after the learning or training experience has taken place.

Through tax benefits, enterprises might be encouraged to contribute in kind or to allow universities to make use of equipment or facilities.

Governments can develop strategies to encourage involvement of micro-enterprises and the informal sector in university–enterprise cooperation. They can tap into experience from the EU, where there is much good practice in, for example, the development of business incubators for micro-enterprises.

Governments might introduce incentives into the governance system by linking agreed institutional objectives to funding. The actual achievements should be assessed and evaluated and the result balanced in the light of further support.

Here too governments can learn much from their peers elsewhere in the world through policy learning. If such learning cannot be supported through the Tempus programme, other avenues to accommodate this should be found within the new EU external aid programmes.

Universities and enterprises

At an organisational level universities and enterprises have to rethink their strategic approaches and identify opportunities of mutual benefit. Both universities and enterprises should be clear about their core business and about how to get a competitive edge. They have to identify not only their core business but also their core competences and their unique resources in order to find out to what extent a strategic alliance with one or more partners from the other sector (universities or enterprises) will help them to better achieve their goals. They could appoint a university–enterprise coordinator who would look for such cooperation opportunities, or establish a separate office (as in the Spanish example in section 4.2) to broker contacts.

Enterprises, large and small, should include cooperation with the world of learning in their strategies and business plans in order to remain competitive and gain or maintain access to up-to-date technologies.

Annexes

Glossary

Core skills	These are process skills and elements of personal and social development that all children and adults need in their daily and working lives: communication skills, numeracy, problem-solving skills, IT skills and cooperation skills.
DG EAC	The European Commission's Directorate General for Education and Culture
Enterprise	In this publication, an enterprise is any entity with economic activity, regardless of legal status. This can include multinationals, SMEs and even actors in the informal economy, as well as NGOs, semi-public institutes, chambers of commerce, professional associations and their training bodies.
NCP	National Contact Point – the Tempus information points in the EU member states.
NGO	Non-governmental organisation.
NTO	National Tempus Office – the Tempus information points in the partner countries.
SME	Small and medium-sized enterprise.
Tempus countries	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro, and Kosovo; Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, the Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan; Algeria, Egypt, Jordan, Lebanon, Morocco, the Palestinian Authority, Syria and Tunisia.
Tempus regions	Eastern Europe and Central Asia, the Mediterranean, the Western Balkans
University	In this publication a university is any type of higher (tertiary, ISCED V and VI) education establishment, unless otherwise specified.

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