Editorial

Marina Ranga

Triple Helix Research Group,
Human Sciences and Technology Advanced
Research Institute (H-STAR),
Stanford University,
210 Panama Street, Cordura Hall,
Stanford, 94305 CA, USA
E-mail: marina.ranga@stanford.edu

Biographical notes: Marina Ranga is a Senior Researcher at Stanford University's H-STAR Institute and Visiting Professor at the University of Warsaw's School of Management. Her research interests include Triple Helix systems and the entrepreneurial university, academic entrepreneurship, national/regional innovation systems and European integration, innovation in higher education, gender in innovation and entrepreneurship. She has a broad international experience, having worked extensively with the UN, European Commission, OECD, national and regional governments, universities and private organisations.

The first decade of the 2000s saw a double round of European Union (EU) enlargement: first, in 2004, with ten countries from Central and Eastern Europe and the Mediterranean basin – Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia, Malta and Cyprus, and secondly in 2007, with two Eastern Europe countries – Romania and Bulgaria. Another round followed in July 2013, when Croatia, a Western Balkan country, became an EU member. This eastwards expansion of the EU, which was the largest in terms of territory, number of states and population since the 1957 inception of the Union, has been seen as a natural evolution of a political process in Europe that was aimed to bring to an end the territorial divisions inherited from World War II and start a new zone of peace, stability and economic prosperity. Important benefits for an enlarged Union have thus been gained, such as a population of about 500 million and the largest internal market in the world, significant economic, legal, environmental, cultural and social advantages, more stability and a stronger role in global governance affairs. A continuation of the enlargement process is expected in the future, with candidate countries like Iceland, Macedonia, Montenegro, Serbia and Turkey, which are now at different stages of the negotiation process.

In order to narrow the disparities between the 'old' and the 'new' member states and ensure the functionality of the enlarged Union, a complex process of integration was put in place at several levels: political, economic, monetary, trade, competition, capital movement, intellectual property rights, health, education, research, etc., encompassing both a pre-accession strategy, with specific stages and instruments (European Commission, 2001) and post-accession activities within the enlarged Union.

The higher education, research and innovation sectors of the new EU member states underwent several key transformations as part of the integration process. In higher education, the Lisbon Strategy, adopted in 2000 further to a European Council resolution,

and the Bologna Process initiated in 1999 with the aim to create a European Higher Education Area (EHEA) by 2010 have been two major driving forces for 'europeanisation'. In research, the EU's Framework Programmes for Research and Technological Development (FPs) 6 and 7 (2002–2006 and 2007–2013, respectively) have been instrumental to integration. FP6 held as its main objective the creation of a European Research Area (ERA) and designed specific instruments to structure and strengthen the ERA.[1] FP7 took the construction of the ERA to a next level, focusing on two main strategic objectives: strengthen the scientific and technological base of European industry, and encourage its international competitiveness. In addition, a better synergy between the EU's research and innovation policies and cohesion and regional development policies (synthesised in the national and regional smart specialisation strategies recently developed as an ex-ante conditionality for accessing European Structural and Investment Funds in the programming period 2014–2020) is expected to ensure a better use of resources and stimulate the EU integration.

Where are we today, ten years after the 2004 enlargement? The integration process proved to be far from straightforward and is still work in progress, although important steps forward have been taken. Evaluation studies looking at the state of EU integration to date confirm that convergence among the EU member states is taking place, but slowly, with persisting disparities between the 'old' and the 'new' member states:

- In higher education, the implementation of the Bologna process and the construction of the EHEA differ considerably from one country to another, especially in the newcomer countries that joined in 2004. Lower levels and less diversified structure of national funding for higher education institutions in the new EU member states are among the key causes for the difficult catching up. In addition, a slower integration on the labour markets and marked differences in salaries, wages and employment opportunities often outweigh the benefits of higher labour mobility.
- In research, the achievements of FP6 and FP7 have been much less visible in the new member states, which had lower levels of participation in these programmes, in terms of researchers, project coordinators and funding, than the 'old' member states.
- In innovation, none of the new member states is among the *innovation leaders* that have a performance well above that of the EU average. Most of the new EU member states are *moderate and modest innovators*, and only three new EU member states (Cyprus, Estonia and Slovenia) are innovation followers. Convergence dynamics within country group shows that while a convergence with decreasing differences in innovation performance is observed in the *innovation leaders*, *innovation followers* and, to a certain extent, in the *modest innovators* group, this is not the case for the Moderate innovators, where differences between countries have rather increased over time (European Commission, 2014).

Overall, these disparities reflect the lack of a competitive research and innovation environment at national level in the new member states, but they are also a consequence of the very design method of FP7, which: "reflects the structure and capabilities of economies with more mature research and innovation environments; it was designed according to the orientations and interests of the scientific and innovation potential of these countries and it does not reflect enough the different starting points of all EU member states. As a consequence, FP7 is less accessible for some member states" (EU-12 Member States, 2011).

These disparities also reflect the effect of a few other factors:

- The *'convergence clubs' factor*: these disparities mirror very well the 'convergence clubs' view of global economic theory (Baumol, 1986), which argues that countries with similar structural characteristics and initial conditions (e.g., educational levels, income per capita, infrastructure, investment levels, etc.) converge towards one another and form a club. We retrieve industrial countries in one convergence club, middle-income countries in a different club, only moderately converging, and low-income countries in yet another club, actually diverging over time and having little convergence with the others. In our case, the diverging 'convergence club' can be easily recognised in the moderate innovators group, and to some extent, in the modest innovators group, both encompassing several new EU member states that share similar features in terms of education, research and innovation, as well as other economic, cultural, historic and political features.
- The *time factor*: it is well-known that the multiple changes encompassed by the integration process (institutional, structural, policy, etc.) are long-term processes, requiring longer periods of analysis, and thus, from several view points, it may be still too early to see full-fledged effects of the integration.
- The *diversity factor*: it is also well-known that the diversity of national/regional research and innovation systems across Europe, in terms of specialisation patterns, infrastructures, institutional set-ups, consumer demand structures and policies, is an important part of the countries' and regions' knowledge base. As Gregersen and Johnson (1996) argue, this needs to be preserved for maintaining or increasing the communication and interaction between different types of knowledge, skills, competencies, and for sustaining interactive learning, and thus it is not surprising to see what they had anticipated already in the mid-1990s: "only a very partial European system of innovation in a narrow sense of the term is likely to emerge in the not too distant future" [Gregersen and Johnson, (1996), p.489].

Still, a key question that emerges is how can EU integration minimise these path dependency effects and speed up the convergence process among the EU member states in higher education, research and innovation, while minimising some negative effects arising from that process, such as concentration of research capacities in the more research-intensive countries, brain-drain and migration of skilled labour from the less innovative countries to the more innovative one, etc. We argue that an answer to this question requires:

1 Stronger connections between higher education, research, innovation, cohesion and regional development areas, that need to be reflected in the main policies, programmes and related initiatives addressing these areas at the EU level in the current programming period 2014–2020 (Erasmus+, Horizon 2020 and smart specialisation strategies) and at national/regional level. These connections so far have been either very weak (e.g., research-innovation in FP6 and FP7), or very vague (e.g., higher education – research and innovation). Innovation in higher education, and the potential benefits of increased university-industry cooperation in the area of education have only in the last 2–3 years been adopted as a focal point in the European Commission's DG Education and Culture[2], and measures to enhance entrepreneurial education in universities are still at an early stage in Europe (see the

Knowledge Alliance pilot initiative to create new multidisciplinary curricula to promote entrepreneurship within education and develop other transferable skills). The connection between teaching and learning, research and business have only recently been recommended (High Level Group on the Modernisation of Higher Education, 2013). Achieving a stronger combined approach of these key areas for growth will take better advantage of EU's significant integrative power and complex arsenal of resources, mechanisms and infrastructures, and implement de facto the 'knowledge triangle' of education, research and innovation.

2 A re-thinking of the innovation models applied so far in the conceptualisation and operationalisation of change-inducing processes in the new EU member states. Reform and restructuring of the research and innovation systems of new EU member states (most of which are Central and Eastern Europe countries, formerly known as countries in transition from a centrally-planned to a market economy) have been largely guided so far by the theoretical framework of national/regional innovation systems. The Triple Helix model of university-industry-government relations has been much less visible and had significantly less impact in these countries, because of some structural characteristics that impeded the diffusion and use of the model. To mention just a few, weak connection between education, research and innovation, as universities are still primarily teaching institutions, with low capacity of commercialising academic research through technology transfer and entrepreneurial activities (patenting, licensing, spin-off formation and incubation, etc.), concentration of research activities in public research institutes and universities, with only a small share performed in industry, low demand for research and innovation in industry, low public and private research and innovation expenditure. To that could be added the lack of capital, a weak civil society and a "special division of labour, with long-lasting interdependency to the 'old' member states", which slowed down the European integration efforts to turn these countries into a set of innovation-driven economies (Farkas, 2011). These distinctive characteristics of the new member states make them a particular sub-field within European integration studies (or 'Europeanisation', as they are also sometimes called) and renders difficult the effort to analyse them in light of lessons drawn from previous rounds of EU enlargement (Sedelmeier, 2011).

Many of these characteristics have, however, gradually changed over the last decade, as a result of better national research and innovation strategies and policies, aligned to those of the EU, participation in the EU's Framework Programmes discussed above and allocation of Structural Funds. A better differentiation between policies, programmes, institutions and coordination mechanisms for research, on the one hand, and for innovation, on the other, has gradually been achieved in recent years. The Triple Helix model has gained increasing visibility in innovation studies in these countries, as a framework for exploring the move towards capitalisation and commercialisation of knowledge and research through science-industry cooperation, the development of closer links between business and universities facilitated by new government programmes, the dynamics of high technology development and the emergence of competitiveness clusters. In this context, we argue that the new concept of Triple Helix systems (Ranga and Etzkowitz, 2013), recently introduced as an analytical framework that bridges innovation systems theory and the key features of the Triple Helix model, can provide

useful insights and facilitate a better understanding of the complex dynamics of EU integration.

Against the backdrop of this rich picture of EU integration, this special issue captures recent developments in the new EU member states that focus on three main topics:

1 the development of Triple Helix systems

2 smart specialisation

3 effectiveness of recent policies supporting the innovation capacity of companies, especially SMEs.

The first topic – the development of Triple Helix systems – is addressed in two papers. Jadranka Švarc provides a comprehensive analysis of emerging Triple Helix systems in the Western Balkan countries (WBCs), a region that includes Croatia, now an EU member, and several other countries that are considered for future EU enlargement.[3] The author provides a compelling argument for the usefulness of the Triple Helix systems framework, which appears to be much more suitable to the realities of these countries than the 'old' Triple Helix model that has been perceived in this part of the world as largely irrelevant. The author argues that the Triple Helix systems concept offers a new perspective for analysing innovation in the WBCs and proves that Triple Helix innovation can exist also in technology laggards like the WBCs, albeit in incipient forms, and can consolidate R&D and technology-driven innovation. The thesis of the paper is that the impediments to and the perspectives of implementing Triple Helix systems in the WBCs depend on the performance and maturity of the main components of WBCs' research and innovation systems, which provide the inputs for the Triple Helix knowledge, innovation and consensus spaces. Four main components of WBC's research and innovation systems are thus scrutinised: research capacities and policies; institutions and policy programmes for entrepreneurship and non-R&D-driven innovation; institutions and policy programmes for R&D-driven innovation; and innovation governance. Based on the level of maturity and performance of these components, three types of WBCs are identified, with low, medium and good perspectives for developing Triple Helix systems, respectively. A further classification of WBCs is made, in terms of development level of their Triple Helix spaces and overall perspectives to establish Triple Helix systems. Although the transition to a functional Triple Helix system may appear at first sight as an unrealistic task for the majority of WBCs, it could, however, be a relevant objective if universities could be encouraged to take an active, if not leading, role in promoting technological change by strengthening government-university and university-industry dyads. Universities could thus compensate for companies' inability to create and apply competitive and advanced technologies. Government support, or a stronger government-university dyad, is essential in achieving this objective. The author concludes by discussing several policies that could be adopted to improve production capacities and strengthen the entrepreneurial spirit in the WBCs. These actions illustrate the close interaction and articulation between the Triple Helix spaces and anticipate the type of Triple Helix innovation that needs to be generated in these countries.

Igor Yegorov and Marina Ranga explore the emergence of a Triple Helix system in Ukraine – a possible EU candidate country in the future – and the influence of EU cooperation performed so far on the development of such system. The topic is examined in the context of the recent political developments that followed the country's decision to

suspend the Association Agreement and the Trade Agreement with the EU. This decision froze a process of rapprochement to the EU initiated nearly two decades ago and triggered a chain of events with dramatic consequences for the economy and territorial integrity of the country, as well as significant political turmoil in the whole region and a large part of the world. For the research and innovation system of the country, the most important consequence is that the opportunities to scale up the existing cooperation with the EU that are made possible by the Association Agreement, and could generate more pervasive positive effects within Ukraine's research and innovation system, have been much delayed. The much-needed research and innovation inputs to the country's economic growth remain minor in a failing economy, where tanks and soldiers brought back a spectre of war that was thought to belong to times long gone. The authors demonstrate that an emerging Triple Helix system is in place in Ukraine and can provide the basis for a functional Triple Helix system if further consolidated. They identify six main forms of EU cooperation, among which the framework programmes have been the most significant and influenced most visibly the Knowledge Space and least visibly the Innovation Space. The authors conclude that synergies between national and EU policies and resources are critical for transforming the existing industry-government and university-government dyads into a functional university-industry-government triadic partnership and a dynamic Triple Helix system. Stronger connections between the more advanced Knowledge and Consensus Spaces can also catalyse the development of the weaker Innovation Space.

The second topic – smart specialisation – is addressed in two papers. Miroslaw Miller et al. discuss the challenges of implementing a smart specialisation strategy in Poland. After a thorough diagnosis of the Polish RDI system introduced here as the background for the implementation of a smart specialisation strategy, the authors analyse a range of obstacles to this process, identified mainly at the level of regional innovation governance and policy-making. The authors analyse the difficult policy choices that need to be made between horizontal measures that can enhance innovation and research overall, and targeted measures to support clearly identified priority domains that might form the core of a smart specialisation approach. They conclude that embracing smart specialisation does not preclude Poland from pursuing other innovation strategies, such as building up its attractiveness as a destination for off-shore global RDI. Rather, a wise implementation of smart specialisation is recommended as the way to enhance the country's capability to develop its national innovation system and accelerate profound political and cultural change leading to new thinking and new behaviour in innovation, which may be Poland's true challenge.

Ewa Okoń-Horodyńska authors the second paper on smart specialisation, which presents the experience of implementing a smart specialisation strategy in the Malopolska region, one of the 16 Polish regions. This region has successfully developed its own methodology for designing a smart specialisation strategy able to trigger knowledge-based structural changes in the economy, and also designed a regional open innovation strategy (ROIS). The approach adopted by the regional authorities in identifying smart specialisation priorities was based on the objective to build a knowledge-based local economy and stimulate the sectors with high added value, create demand for innovation and build an information society. Intra- and inter-regional needs have been analysed in correlation with national and EU priorities, global technology trends and foresight research. A collective brainstorming and consultation process of all key actors was put in place, which ensured not only wide participation of regional actors,

but also political support, substantive leadership and responsibility for the preparation and implementation of the strategy, and helped building the civic society in the region. Moreover, this approach went beyond the traditional disciplinary organisation and narrowly defined specialisations of the Polish higher education system and facilitated inter-disciplinary connections that can spur cross-sector innovation. The resulting 'smart specialisation diamond' encompassing Malopolska's smart specialisation areas included four areas (life sciences, sustainable energy, ICT and chemistry), each with own sub-areas, which could be used to create possible combinations of structural changes in the region. A dedicated development strategy will be developed for each of these smart specialisation areas, in order to ensure an efficient management and adjustments in case of lack of progress. These strategies are expected to trigger four types of change in the entrepreneurial discovery process.

The third topic – effectiveness of recent policies supporting the innovation capacity of companies – is addressed in Andrzej Jasinski's paper, which examines the impact of six innovation policy instruments launched in Poland during 1997–2011 on enhancing the innovation performance of Polish companies, mostly SMEs: an Innovation Fund, implemented only in enterprises with a formal R&D Centre status; technological credits; technological relief; innovation loans; innovation vouchers; and support for obtaining grants. The usefulness of these schemes to the Polish companies examined proved to be relatively low. These tools were found to be too weak to stimulate innovation, systematic in-house R&D and cooperation with research institutions or with international partners, too demanding and time-consuming, and with little visibility in the business community. These findings reflect, on the one hand, structural weaknesses of the Polish economy, such as poor R&D potential, low R&D expenditure, little cooperation with research institutions and international partners, weak bridging institutions between science and business, and excessive reliance on own technological solutions. On the other, they also denote flaws in the policy design, especially a narrow targeting of beneficiaries. The schemes lacked diversification and a selective approach to supporting innovations in priority sectors, such as high-technology sectors or less-developed areas/regions. The interest in these schemes, funded from the national budget, was often outweighed by the interest in the operational programmes financed from EU funds. To improve this state of play, the author recommends a stronger support to company R&D and to the institutions operating at the science-industry interface in order to boost technology transfer and innovation diffusion, as well as a stronger diversification of the structure and operations of national R&D units for a richer supply of modern solutions to the needs of innovative enterprises.

References

Baumol, W.J. (1986) 'Productivity growth, convergence, and welfare: what the long-run data show', *American Economic Review*, Vol. 76, No. 5, pp.1072–1085.

EU-12 Member States (2011) *Common Position Paper of the EU-12 Member States for the Next Framework Programme* [online] http://ec.europa.eu/research/csfri/pdf/contributions/prior/common_position_paper_of_the_eu-12_member_states.pdf.

European Commission (2001) *Enlargement of the European Union. An Historic Opportunity*, Directorate General Enlargement, Brussels

European Commission (2014) *Innovation Union Scoreboard 2014*, Directorate General Enterprise and Industry, Brussels.

Farkas, B. (2011) 'The Central and Eastern European model of capitalism', *Post-Communist Economies*, Vol. 23, No. 1, pp.15–34.

Gregersen, B. and Johnson, B. (1996) 'Learning economies, innovation systems and European integration', *Regional Studies*, Vol. 31, No. 5, pp.479–490.

High Level Group on the Modernisation of Higher Education (2013) Report to the European Commission on Improving the Quality of Teaching and Learning in Europe's Higher Education Institutions, June.

Ranga, M. and Etzkowitz, H. (2013) 'Triple Helix systems: an analytical framework for innovation policy and practice in the knowledge society', *Industry and Higher Education*, Vol. 27, No. 4, pp.237–262.

Sedelmeier, U. (2011) 'Europeanisation in new member and candidate states', *Living Reviews in European Governance*, Vol. 6, No. 1 [online] http://www.livingreviews.org/lreg-2011-1 (accessed 29 June 2014).

Notes

1 Networks of excellence (NoE), integrated projects (IP), specific targeted research projects (STREP) and specific targeted innovation projects (STIP), specific research projects for SMEs, Specific actions to promote research infrastructures, and Marie Curie actions on mobility, training, knowledge transfer and excellence recognition. See http://ec.europa.eu/research/fp6/pdf/fp6-in-brief_en.pdf for details.

2 See, e.g., the recent projects commissioned by DG Education and Culture 'Innovation in Higher Education' which examines the effect of new technologies like MOOCs, learning analytics, etc. on teaching and learning, and 'Measuring the impact of University-Business cooperation', which looks at tangible and intangible effects of university-business-cooperation on education and develops an assessment methodology and relevant indicators for measuring the outcomes and impact of university-business cooperation on education.

3 The Western Balkan countries (WBCs) include; Albania, Kosovo, Serbia, FYR Macedonia, Bosnia and Herzegovina (B&H) and Montenegro. Croatia was a member of this geopolitical group until 1 July 2013, when it became an EU member, but considering its geographical position and many similarities with the WBCs, it was also included in the analysis.