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Forum Sofia 2018



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Prepared by François Staring

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1 Introduction

The European Commission provides support to higher education institutions (HEIs) and businesses by strengthening the knowledge triangle (education-research-innovation) through actions and initiatives relating to University-Business Cooperation (UBC).¹ One of the key initiatives is the University-Business Forum (UB Forum), which for nearly ten years now has brought together HEIs, businesses and other key stakeholders to:

- *Encourage the sharing of knowledge and experience, support mutual learning;*
- *Create long-term partnerships and opportunities;*
- *Drive innovation, entrepreneurship and creativity.*

Since 2008, 22 UB Forums have been organised: 7 high-level European University-Business Forums (which took place in Brussels, the most recent one was in April 2017) and 15 Thematic Forums in the Member States (more recently, these took place in Austria, Finland, the Basque Country, and Croatia).

The UB Forum events help disseminate good practice, and exchange experience, networking and the development of partnerships between HEIs and businesses. The events have generated many new ideas, some of which have been translated into European policy tools. These include the Knowledge Alliances under Erasmus+, and HEInnovate,² a self-assessment tool for HEIs to measure and develop innovative capabilities and help them learn from case studies and other training materials.

The forthcoming UB Forum is hosted by the European Commission, in partnership with the Bulgarian Ministry of Education and Science and the Bulgarian Industry Association. The event is organised in the framework of the Bulgarian Presidency of the Council of the European Union and will take place at the National Palace of Culture (NDK) in Sofia.

The focus of this UB Forum is '**University-Business Cooperation – A Partnership for Modernisation and Growth**'. It will examine three major themes which are key in ensuring HEIs are equipped to cooperate effectively with their regions, and can provide their students with the knowledge, skills and attitudes they need to act as 'innovation leaders' in their region:

- The first enabler is **ensuring that the education system is effectively structured and focused on the needs of the changing labour market**. Here, the UB Forum will examine leadership, management and governance in higher education;
- The second theme is **driving regional innovation and development**. Areas to be covered include smart specialisation and cross-border collaboration;
- The third theme is **entrepreneurship education and development**. This will consider education, social entrepreneurship, and societal challenges.

This input paper provides background information on the Bulgarian higher education system and university-business cooperation, and highlights the key themes of the UB Forum.

¹ See http://ec.europa.eu/education/tools/university-business_en.htm

² See <https://heinnovate.eu/>

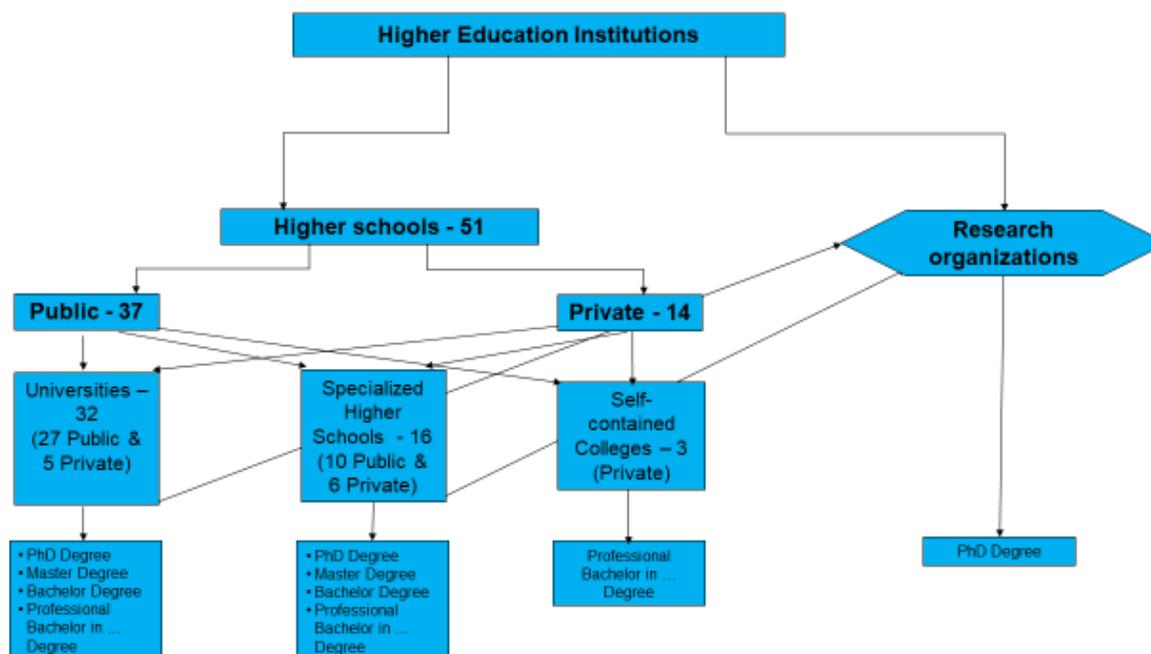
2 Bulgarian Higher Education System

2.1 OVERVIEW

Higher education in Bulgaria is provided by Universities, Specialised Higher Schools and Self-Contained Colleges.³ Universities typically provide education on a wide range of subjects in three of the four major branches of science: the Humanities, Natural Sciences, Social Sciences and/or Technical Sciences. They offer Bachelors, Masters and Doctoral Degrees and contribute to the development of these academic fields through various education and research activities. The educational offer of *Specialised Higher Schools* is more narrowly focused one of the major sub-areas of Science, Arts, Physical Culture and/or Military Service. The education offered to students by these institutions also focuses more on scientific research, and artistic and creative activities. *Self-Contained Colleges* offer professionally oriented Bachelor Degrees with a full-time faculty offering at least a half of the teaching and practical exercises in each specialty. Colleges can also be part of a university or a specialised higher school. Finally, training in doctoral programmes are also offered by *Research Organisations*, such as the Bulgarian Academy of Science (BAS) or the Agricultural Academy.

The tertiary education system in Bulgaria currently consists of 51 HEIs, 14 of which are private (see Figure 2.1). Although the average number of HEIs lies between 11 and 100 across the EHEA,⁴ taking into account the size of the population and territory the number of HEIs in Bulgaria exceeds the EU-28 average.⁵ The Ministry of Education and Science (MES) is responsible for the elaboration and implementation of long-term national policy and for supporting the academic autonomy of HEIs, as well as for monitoring the quality of their education and scientific research.

Figure 2.1 Overview of higher education institutions in Bulgaria



Source: Prepared by the Bulgarian Ministry for Education and Science (MES).

³ EURYDICE/EACEA/EC (2012). *Bulgaria: Higher Education*. Last modified on 12 December 2012. Available at: https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Bulgaria:Higher_Education

⁴ EC/EACEA/EURYDICE (2015). *The European Higher Education Area in 2015: Bologna Process Implementation Report*. Luxembourg: Publications Office of the European Union, p. 36. Available at: https://eacea.ec.europa.eu/sites/eacea-site/files/european_higher_education_area_bologna_process_implementation_report.pdf

⁵ MINISTRY OF EDUCATION AND SCIENCE (2014). *Strategy for development of higher education in the republic of Bulgaria for the 2014-2020 period*. September 2014. Sofia: Ministry of Education and Science, p. 7. Available at: <https://rio.jrc.ec.europa.eu/en/library/strategy-development-higher-education-republic-bulgaria-2014-2020-period>

2.2 HIGHER EDUCATION PERFORMANCE

The **2017 Education and Training Monitor for Bulgaria**⁶ shows significant challenges in the field of the **skills composition of the population, strongly related to low tertiary education attainment rates and a mismatch between higher education outcomes and labour market needs**. Although the gap is narrowing, the tertiary education attainment rate in Bulgaria (33.8%) remains below the EU average (39.1%).⁷ This is in turn related to the low number of students enrolled in higher education studies in Bulgaria. Over the 2013/2014 academic year alone, 8,000 student placements were not filled and the number of Bulgarian students studying abroad was equivalent to around 8% of the entire student population.⁸ Bulgaria's ageing population, low birth rates and increasing educational brain drain among skilled young people are amplifying this trend.

The **employment rate of recent higher education graduates** dropped to 78.5% in 2016, which is below the EU average 82.8%.⁹ **Important skills mismatches** exist between higher education and the labour market. On the one hand, there is a *vertical mismatch* in the sense that 35% of graduates are employed in positions not requiring a higher education qualification – as opposed to an EU average of 25%. On the other hand, there is a *horizontal mismatch* between the “types” of graduates the Bulgarian higher education system delivers and the skilled human capital the economy needs. In particular, there is a demand for more highly skilled STEM graduates.¹⁰ In order to improve labour market relevance and quality of the higher education system, a new performance-based funding model was introduced, prioritising 32 professional fields in public universities, including fields related to STEM – ICT and mathematics in particular.¹¹ Although the lack of STEM graduates is an issue overall, there is a particular lack of female STEM graduates. And the **gender imbalance** in the total number of higher education graduates is an issue more broadly for the sector. 41% of women have a tertiary degree compared with 27.2% of men.¹²

Another challenge is **ensuring the quality and relevance of higher education**. There are weaknesses in the implementation of internal quality assurance systems by HEIs and the procedures for accreditation of the National Evaluation and Accreditation Agency are complex and therefore time- and resource-consuming for institutions. Furthermore, the ageing of academic staff, the lack of innovative teaching methods and work-based learning components have a negative impact on students' overall motivation. The system also attracts too few foreign lectures and scholars to research and teach in Bulgaria whilst these would precisely contribute to improve the efficiency and quality of higher education.

A further challenge is the **low level of scientific activity** of HEIs. The fragmentation of the higher education system into many small institutions, including insufficient funding for R&D overall in Bulgaria (see Chapter 3 below) makes it difficult to achieve a critical mass in research.¹³ Bulgaria also faces challenges to motivate students to turn to science and research. As a result, the number of publications in scientific journals is low, in particular in the field of Humanities and Social Sciences.

The **management and governance of the HE system and institutions**, finally, could benefit from a greater participation of business representatives, public institutions and students in order to improve the overall quality and relevance of higher education. Furthermore, by combining the autonomy of HEIs with mechanisms for accountability according to criteria such as transparency, public control and academic competition. The statute of the different types of higher education institutions and educational and qualification degrees would benefit from clarification. In particular, there is no clear distinction between Universities and Specialised Higher

⁶ EC (2017). *Education and Training Monitor 2017: Bulgaria*. Brussels: European Commission. Available at: https://ec.europa.eu/education/sites/education/files/monitor2017-bg_en.pdf

⁷ *Ibid.*

⁸ MINISTRY OF EDUCATION AND SCIENCE (2014). *Strategy for development of higher education in the republic of Bulgaria for the 2014-2020 period*. Sofia: Ministry of Education and Science. Available at:

<https://rio.jrc.ec.europa.eu/en/library/strategy-development-higher-education-republic-bulgaria-2014-2020-period>

⁹ EC (2017). *Education and Training Monitor 2017: Bulgaria*. Brussels: European Commission, p. 8. Available at: https://ec.europa.eu/education/sites/education/files/monitor2017-bg_en.pdf

¹⁰ CEDEFOP (2017). *Skills Panorama*. Available at: <http://www.cedefop.europa.eu/fr/events-and-projects/projects/eu-skills-panorama>

¹¹ EC (2017). *Education and Training Monitor 2017: Bulgaria*. Brussels: European Commission, p. 8. Available at: https://ec.europa.eu/education/sites/education/files/monitor2017-bg_en.pdf

¹² *Ibid.*

¹³ *Ibid.*

Schools. Some higher education institutions undertake significant research activities, while others do not at all. Furthermore, the 'Professional Bachelor in' is not clearly recognisable as part of the three-level Bologna cycle. The network could be optimised by promoting a closer integration and unification of HEIs.

Measures to improve Bulgaria's higher education performance

To **improve the alignment between higher education outcomes and labour market needs**, the Bulgarian Ministry is planning to develop a number of measures under the Council of Ministers' Decree № 121/25. The first one has the aim to base the planning for the annual number of undergraduate and graduate students to be enrolled at public universities and research organisations on an integrated analysis and forecasts of graduate needs in cooperation with employers, trade unions and professional organisations. Alongside the universities, especially those with an applied profile will be encouraged through financial and fiscal means in partnership with businesses to monitor and flexibly respond to the emergence and development of new professional niches in the labour markets in Bulgaria and other European countries. At the same time, dialogue between universities and businesses on the content of training will be strengthened and regulated, and talented students will be attracted in the development and realisation of research and business projects at the universities. Curricula will be updated periodically in line with labour market needs. And, based on an integrated assessment by the Ministry of the quality of education and its compliance with the needs of the labour market, changes in the funding model for public universities have already been introduced in order to stimulate HEIs to close any unnecessary specialities.

Based on these strategic and normative documents, the Council of Ministers' Decree № 64/25.03.2016 sets the **conditions and procedures for approval of the number of students enrolled for training in the state universities** and includes an **adopted list of priority professional fields**. With this Decree and the approved list, the funding of professional fields in which universities fail to compete with others has been limited. It is hoped that this will encourage HEIs to focus their efforts mainly on the professional fields in which the quality of training is sufficient and the students' realisation is good. It is also anticipated that this will strengthen the professional fields of the Bulgarian higher education system as a whole, prepare the best specialists, increase competition between universities, and furthermore contribute to strengthening HEIs in their role as research centres.

An important tool to improve the quality, competitiveness and transparency of higher education is the **Bulgarian Universities Ranking System**,¹⁴ which was created within the Operational Programme "Human Resources Development". It supports prospective students to make informed choices and serves as a basis for analysis and taking management decisions by universities, employers and the expert community. The web-based English version of the Ranking System serves as an additional prerequisite to increase the visibility and presence of Bulgarian universities in the European and global educational sphere, and has been updated in line with the current trends in the creation of ratings in the EU.

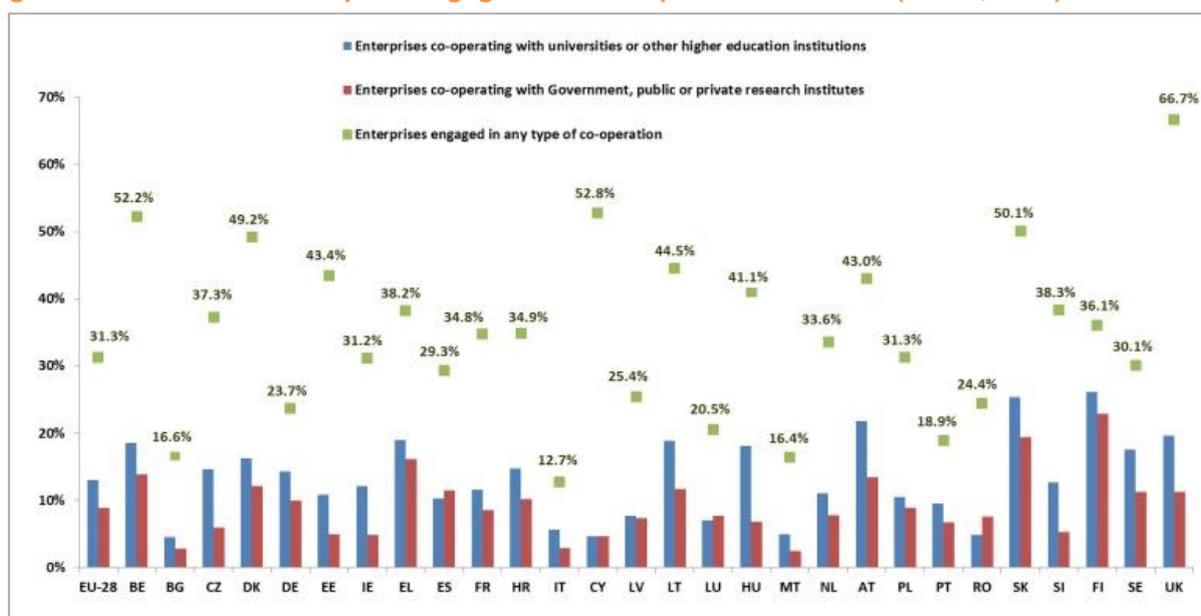
¹⁴ See <http://rsvu.mon.bg/rsvu3/>

3 University-Business Cooperation in Bulgaria

3.1 THE STATE OF UNIVERSITY-BUSINESS AND SCIENCE-INDUSTRY COOPERATION

University-business cooperation in Bulgaria has increased significantly since 2016, but is still in the early stages of development. In 2012, after Malta (16.4%) and Italy (12.7%), Bulgaria (16.6%) had the lowest level of business engagement in any type of cooperation activity across the EU-28 (Figure 3.1). Enterprise cooperation with universities or other types of HEIs comes out as particularly low. Only 4.5% of innovative companies cooperate with universities or other HEIs compared with 4.9% in Romania and 14.7% in Croatia. Even less companies (2.8%) engage with the government, public or private research institutions, compared with 7.6% in Romania and 10.2% in Croatia. In the last two editions of the World Economic Forum’s Global Competitiveness Report,¹⁵ however, Bulgaria ranks 74th out of 139 (2016-2017) and 137 economies (2017-2018) respectively after assessing university-business collaboration in R&D. Prior to this, Bulgaria still ranked 112th out of 140 (2015-2016) and 113th out of 144 countries (2014-2015), which seems to point to important developments in the area.

Figure 3.1 Overview of enterprise engagement in cooperation activities (EU-28, 2012)



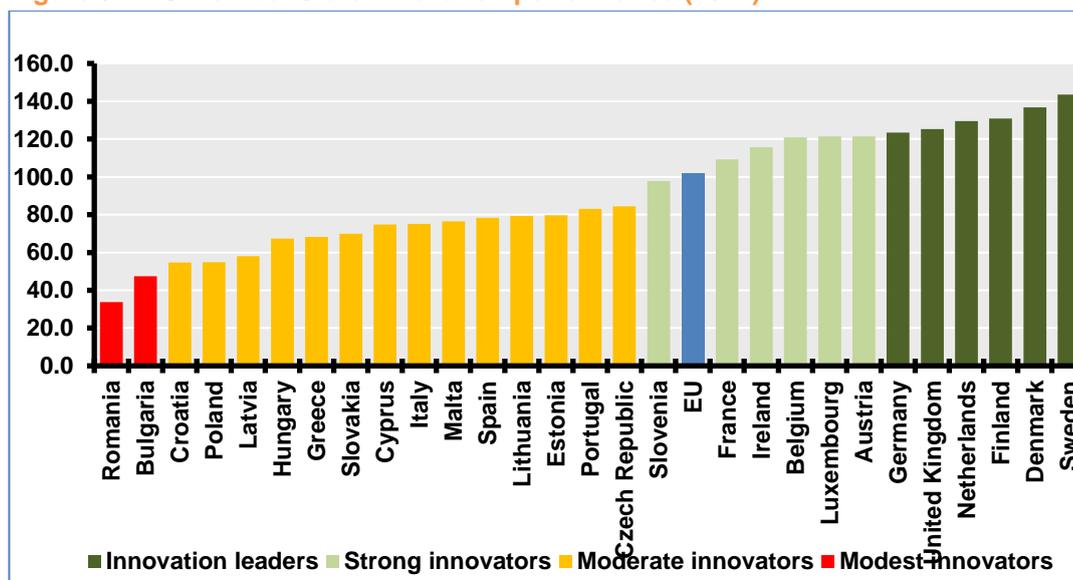
Source: EUROSTAT (2012). *Community Innovation Survey*. Available at: <http://ec.europa.eu/eurostat/web/microdata/community-innovation-survey>

Nevertheless, at a European level the European Commission’s most recent edition of the Innovation Scoreboard identifies **Bulgaria as a ‘Modest Innovator’** (Figure 3.2), performing below average in nearly all innovation dimensions. Bulgaria currently favours a ‘supply-push’ model to science and innovation, which puts scientists at the origin of research projects. The challenge emerging from such an approach is that the technological sophistication and risks associated with the new ideas, applications and services developed are often too high to be transferred to local businesses. Instead, Bulgarian research organisations are forced to focus on more developed external markets in order to sell their innovations. A refocus away from ‘supply driven’ innovation towards ‘demand driven’ and market-oriented research through smart specialisation is therefore crucial.¹⁶

¹⁵ See <http://reports.weforum.org/global-competitiveness-index-2017-2018/competitiveness-rankings/>

¹⁶ TODOROVA, A. & M. SLAVCHEVA (2017). *RIO Country Report 2016: Bulgaria*. Research and Innovation Observatory country reports series. Luxembourg: Publications Office of the European Union, p. 18-20. Available at: <https://rio.jrc.ec.europa.eu/en/library/rio-country-report-bulgaria-2016>

Figure 3.2 EU Member State innovation performance (2017)



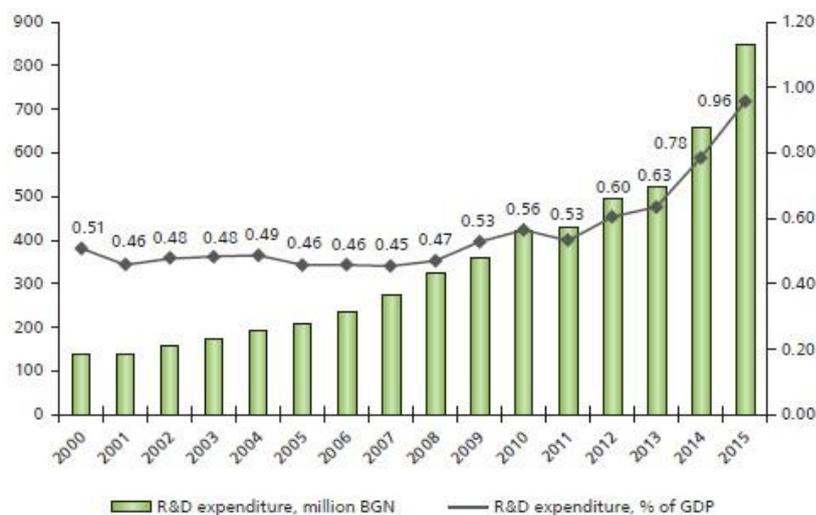
Source: EC (2017). *European Innovation Scoreboard*. Available at: http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en

Indeed, in addition to ‘Finance and support’ and ‘Open, excellent and attractive research systems’, ‘Linkages and entrepreneurship’ emerged as a key area for development in the Innovation Scoreboard for Bulgaria. For the two indicators of ‘Intellectual assets’ and ‘Employment impacts’, performance was better and the country scored only just under the EU average.

1. Finance and support

Public and private research and development (R&D) expenditure has known a sharp increase in recent years (Figure 3.3). In 2015, investment in R&D increased by more than 21.5% to 0.96% of GDP. Compared with the flat growth rate from 2000 until roughly 2011, even during the first years after Bulgaria joined the EU in 2007 (which, to a large extent, is related to the effects of the financial crisis), the almost doubling of GDP investments in R&D can be seen as a positive trend. Nevertheless, Bulgaria is still far away from reaching its national target of 1.5% of national GDP investment in R&D. Moreover, universities’ R&D funding is the lowest in the EU, and business investments in the higher education sector remains low.¹⁷

Figure 3.3 R&D expenditure in Bulgaria (2000-2015)



Source: ENTERPRISE EUROPE NETWORK (2016). *Innovation.bg – Innovation Powered by Talent*. Sofia: Applied Research and Communications Fund, p. 55. Available at: <http://www.arcfund.net/index.php?id=2060>

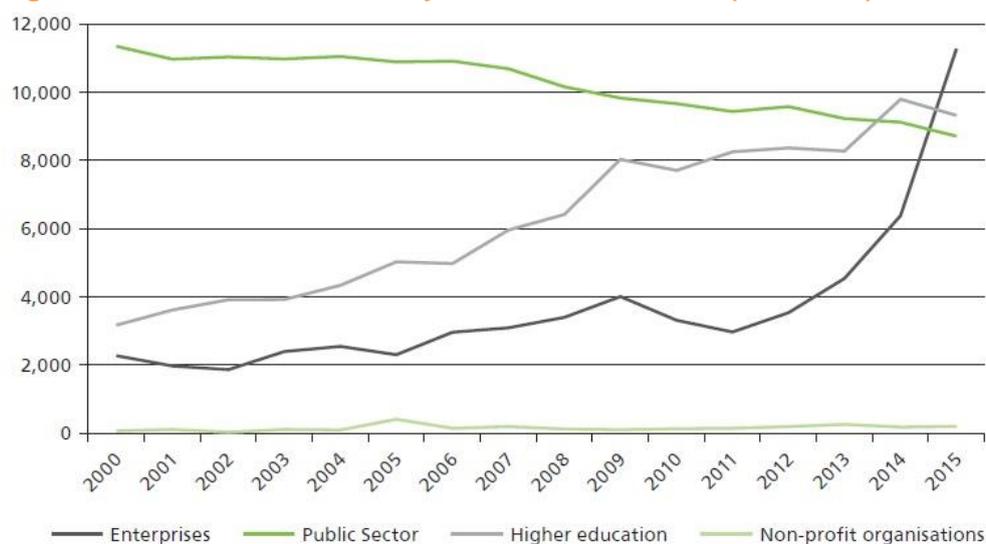
¹⁷ EC (2017). *Country Report Bulgaria 2017 SWD(2017) 68 final/3*. Brussels: European Commission, p. 43. Available at: https://ec.europa.eu/info/sites/info/files/2017-european-semester-country-report-bulgaria-en_3.pdf

2. Open, excellent and attractive research systems

Between 2000 and 2015, the average increase of doctoral graduates by share of the total student population was 1.65% across all educational fields. And over the last five years, the number of mobile students in Bulgaria rose by 15% (or 1,558 students).¹⁸ Although these figures suggest **there has been a gradual increase in the number of doctoral and international students in Bulgaria, the figures remain low, and Bulgaria is facing a “brain drain in two dimensions”¹⁹ – leaving the country and also the research sector.** Indeed, according to Eurostat figures, only 6,600 students obtained a PhD degree in Bulgaria in 2015. This is equivalent to less than 1% of the EU-28 total of 725,500 doctoral graduates.²⁰ As was already highlighted in the section above, combined with the adverse effects of the demographic crisis, too few students at all academic levels take part in research activities. Bulgaria’s higher education system struggles to promote the career of researcher at a Bulgarian HEI as an attractive career option to both home and international students. Instead, many researchers are drawn to other universities across Europe and the world.

As a result, after Romania Bulgaria still has the lowest number of R&D staff in the EU-28 by share of researchers in the working population: 0.48% in 2013 against an average level of 1.12% in the EU. The majority of R&D staff (40%) are located in companies. In 2015, the number of staff engaged in research almost doubled in the business sector (Figure 3.4). By contrast, the public sector has constantly been cutting down on R&D staff since 2000 (a drop of 23% between 2000 and 2015), and there has also been a slight reduction in the number in the number of R&D staff higher education sector from 2014-2015.²¹

Figure 3.4 Number of R&D staff by institutional structure (2000-2015)



Source: ENTERPRISE EUROPE NETWORK (2016). *Innovation.bg – Innovation Powered by Talent*. Sofia: Applied Research and Communications Fund, p. 63. Available at: <http://www.arcfund.net/index.php?id=2060>

3. Linkages and entrepreneurship

Bulgaria currently ranks 54th in the 2017/2018 Global Entrepreneurship Monitor (GEM),²² highlighting many challenges for entrepreneurs in the country, and has the **lowest entrepreneurship activity in Europe**.²³ Strongly related to the previous point on the importance of developing open, excellent and attractive research

¹⁸ ENTERPRISE EUROPE NETWORK (2016). *Innovation.bg – Innovation Powered by Talent*. Sofia: Applied Research and Communications Fund, p. 65-66. Available at: <http://www.arcfund.net/index.php?id=2060>

¹⁹ EC (2017). *Science and Education for Smart Growth. Operational Programme 2014-2020*. Brussels: European Commission, p. 18. Available at: http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/bulgaria/2014bg05m2op001

²⁰ EUROSTAT (2017). *Number of tertiary education students by level and sex, 2015*. Last modified on 30 June 2017. Available at: [http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Number_of_tertiary_education_students_by_level_and_sex_2015_\(thousands\)_YB17.png](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Number_of_tertiary_education_students_by_level_and_sex_2015_(thousands)_YB17.png)

²¹ *Ibid*, p. 63.

²² GLOBAL ENTREPRENEURSHIP RESEARCH ASSOCIATION (2018). *Global Entrepreneurship Monitor: Global Report 2017/2018*. Global Entrepreneurship Research Association. Available at: <http://www.gemconsortium.org/report>

²³ EC (2017). *Country Report Bulgaria 2017 SWD(2017) 68 final/3*. Brussels: European Commission, p. 40. Available at: https://ec.europa.eu/info/sites/info/files/2017-european-semester-country-report-bulgaria-en_3.pdf

systems to increase the number of doctoral graduates, the low supply of skilled graduates overall and the lack of links between higher education curricula and the labour market impacts on Bulgaria's performance in the field of entrepreneurship. As is highlighted in the Commission's recent Communication on a Renewed EU agenda for higher education, "[h]igh quality post-graduate studies and doctoral training are critical. It produces researchers, developers and 'innovation managers' who drive scientific discovery and the promotion and adoption of new ideas".²⁴ As evidenced in the Innovation Scoreboard (see above), the so-called 'Innovation Leaders' in the ranking typically have around and above 2% of the working age population engaged in basic and applied research. The Communication then goes on by saying that HEIs can do more "to facilitate connections between academics, entrepreneurs and public authorities, to align their educational offer to the needs identified in smart specialisation strategies, seize opportunities for innovation in priority sectors, and help local businesses and other organisations understand and adopt new ways of thinking".²⁵

To tackle these entrepreneurship challenges, Bulgaria adopted the 'Entrepreneurship Bulgaria 2020' Plan at the end of 2015, which introduced a module on entrepreneurship in all levels of education from 2016 onwards. In addition, the Ministry of Economy and Energy has funded a number of initiatives in the programming periods 2007-2013 and 2014-2020 to support youth entrepreneurship in Bulgaria.²⁶ However, as stated in a recent HEInnovate country review, there is a narrow understanding of the concept of 'entrepreneurial university' in Bulgaria. "The current understanding of the innovative and entrepreneurial university [...] is focused on the promotion of start-up activities, primarily targeted at students. Organisational capacity, stakeholder links, internationalisation, and leadership are not yet associated with the concept".²⁷

3.2 EFFORTS TO IMPROVE UNIVERSITY-BUSINESS AND SCIENCE-INDUSTRY COOPERATION

As highlighted above, Bulgaria only joined the EU in 2007 after which the financial crisis increased Bulgaria's dependency on public investment for innovation.²⁸ Despite numerous targeted initiatives coming from both the Ministry of Education and Science (MES) and the Ministry of Economy and Energy (MEE) from 2007-2014²⁹ to boost overall R&D performance and university-business cooperation in particular, the separation within the Bulgarian National Innovation System of the publically funded 'research and development pillar' on the one hand, and the private sector 'innovation pillar' on the other, has limited the impact of actions so far.³⁰

The Commission's Operational Programme (OP) "Science and Education for Smart Growth" (SESG) makes an important contribution to supporting Bulgaria in addressing its national R&I challenges. It is also the only OP in Bulgaria to be co-funded by both the ESF and the ERDF for the period 2014-2020, with over €673 million to be invested over this period (of which €596 million from the EU budget).³¹ The OP includes separate priority areas for improved research and university-business cooperation.³² A dedicated call for proposals for the "Creation and development of centres of excellence", for example, led to the funding of 12 projects in 2017, aimed at improving the innovation and entrepreneurship landscape in Bulgaria.³³

²⁴ EC (2017). *Communication on a Renewed EU agenda for higher education COM(2017) 247 final*. Brussels: European Commission, p. 8. Available at: https://ec.europa.eu/education/sites/education/files/he-com-2017-247_en.pdf

²⁵ *Ibid.*

²⁶ See RUMYANA, A. (2014). "Fostering youth entrepreneurship in Bulgaria: Programmes and initiatives". In: *The Małopolska School of Economics in Tarnów Research Papers Collection 25* (2): p. 11-16.

²⁷ HOFER, A.-R. (2016). *RIO Country Report 2015: Bulgaria*. Research and Innovation Observatory country reports series. Luxembourg: Publications Office of the European Union, p. 76. Available at: <https://rio.jrc.ec.europa.eu/en/library/rio-country-report-bulgaria-2015>

²⁸ EC (2017). *Country Report Bulgaria 2017 SWD(2017) 68 final/3*. Brussels: European Commission, p. 37. Available at: https://ec.europa.eu/info/sites/info/files/2017-european-semester-country-report-bulgaria-en_3.pdf

²⁹ E.g. the Operational Programme 'Development of the Competitiveness of the Bulgarian Economy' (MEE, 2007-2013), which successfully financed 33 institutions, including 4 technology centres, 12 business incubators, 16 technology transfer offices and the Sofia Tech Park; or the Science and Business project (MES, started in 2011), aimed at improving the environment for science-business interaction.

³⁰ TODOROVA, A. & M. SLAVCHEVA (2017). *RIO Country Report 2016: Bulgaria*. Research and Innovation Observatory country reports series. Luxembourg: Publications Office of the European Union, p. 18-20. Available at: <https://rio.jrc.ec.europa.eu/en/library/rio-country-report-bulgaria-2016>

³¹ See http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/europe/2014bg05m2op001

³² See EC (2017). *Science and Education for Smart Growth. Operational Programme 2014-2020*. Brussels: European Commission. Available at: http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/bulgaria/2014bg05m2op001

³³ See <http://sf.mon.bg/?go=news&p=detail&newsId=463>

1. *Renewed Strategy – Better Science for a Better Bulgaria (2016-2025)*

Recognising the need to strengthen the knowledge triangle of higher education, research and innovation, Bulgaria was the first EU Member State in 2015 to subscribe to the **EU's Horizon 2020 Policy Support Facility**, which so far has provided a rigorous, independent and up-to-date picture of the Bulgarian research and innovation landscape with evidence-based recommendations for future improvement in 2015, 2016 and 2017.³⁴ Building on these recommendations, the Ministry published a new strategy for 2016-2025 “Better Science for a Better Bulgaria 2025 – Vision for a research policy strategy in support of society and economy”.³⁵

The renewed strategy sets out to maximise the impact of research on the Bulgarian society and economy by improving the overall efficiency and impact of research and innovation, building on the four pillars:³⁶

- **Strengthened partnership in three dimensions:** between HEIs and businesses, research organisations and public sector organisations driving research policy, and within the Ministry between ministries developing and implementing research and innovation policies;
- **Greater complementarity and synergy** between other strategies' objectives and results, such as the National Reform Programme or the Innovation Strategy for Smart Specialisation;
- **Equal involvement of all stakeholders** to link research with the needs of society and inspire private sector investments in R&D;
- **Restoring trust** between the main research and innovation actors to increase collaboration.

As mentioned above, R&D investment in Bulgaria rapidly declined from 2.16% in 1990 to 0.56% in 1995 (as a percentage of national GDP), after which this figure remained stable until roughly 2011.³⁷ This means that the key recommendation under the EU Policy Support Facility for Bulgaria has been to significantly increase R&D investments. Therefore, the strategy sets out the Ministry of Education and Science's ambition to **raise public investment up to 0.45% of GDP by 2020** in order to reach its national target of overall public and private R&D investment of 1.5%. The EU's ESF and ERDF funds under the OP “Science and Education for Smart Growth” (see above)³⁸ are seen as crucial to boost Bulgaria's research system in the years to come.

The commitment to raise public investment in R&D to bring Bulgaria's R&D intensity up to EU levels is coupled with plans towards **greater monitoring of research performance and a restructuring of the research landscape**. The strategy sets out the government's ambition to increase performance-based funding as well as restructuring and modernising the research and innovation landscape in Bulgaria, including universities, to tackle fragmentation, boost complementarity and maximise the impact of public investments in research.

Next, the strategy presents a number of **strategic priority areas for research**, aligned with projections of the sectors in which the Bulgarian economy will grow most actively in the coming years, the needs of the business sector, and the global trends and priorities of the EU under Horizon 2020. As such, the priority R&I fields are:

- Mechatronics, clean technology and new energy and energy efficient technologies;
- Health and quality of life, green and eco-technologies, biotechnologies, eco-foods, purification and waste technologies;
- Environmental protection. utilisation of raw materials and bio-resources; environmental monitoring;
- Materials and Nanotechnology;
- Information and communication technologies; and
- National identity and anthropology. Socio-economic development and governance.

³⁴ See <https://rio.jrc.ec.europa.eu/en/country-analysis/Bulgaria/country-report>

³⁵ MINISTRY OF BETTER EDUCATION AND SCIENCE (2015). *Better Science for a Better Bulgaria. A vision for a research policy strategy in support of society and economy*. Sofia: Ministry of Education and Science. Available at: https://era.gv.at/object/document/2763/attach/BG_Better_ScienceBetter-final_en.pdf

³⁶ *Ibid.* p. 4-5.

³⁷ *Ibid.*, p. 6.

³⁸ See http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/europe/2014bg05m2op001

Finally, the government has developed **incentives for researchers at all stages and to attract and retain young talent from Bulgaria and abroad** to develop the country's overall human capital base. This includes the progressive roll-out of a dedicated individual fellowship programme to support post-doctoral researchers as well as increasing the overall attractiveness of doctoral studies. Ensuring doctoral graduates are equipped with soft or 'transversal' skills which are crucial for the transfer of research outputs and innovations in the business sector; and encouraging HEIs and other research organisations to put into practice the "European Charter for Researchers" and the "Code of Conduct for Recruitment" to create a transparent working environment and career development based on performance.

2. Strategy for the Development of Higher Education in Bulgaria (2014-2020)

In line with the aforementioned incentives for researchers, Bulgaria's Strategy for the Development of Higher Education (2014-2020)³⁹ sets out to **promote research activities in HEIs and develop innovation oriented towards the market economy**. Activities and measures to achieve this include increased funding for HEIs to conduct scientific research including incentives to boost cooperation activities with national and international businesses. The strategy also mentions it will invest in infrastructure to develop regional research infrastructures and national units. Indeed, as is mentioned in the recommendations emerging from the EU Policy Support Peer Review exercise, increasing the sharing of research infrastructure between HEIs and businesses is key to boost overall innovation in Bulgaria.

Market-oriented innovation ecosystems facilitating local knowledge transfer between universities and businesses are emerging in Bulgaria, but appear fragile. Good practice examples such as LAUNCHub and Sofia Tech Park are important innovation pilot projects to test innovation ecosystems which can effectively incentivise the science base to open up to businesses and develop public-private cooperation. However, at the moment the existing initiatives are too isolated and lack strong links to the higher education and research system.⁴⁰

EXAMPLES: LAUNCHub and SofiaTech supporting start-ups and university-business cooperation in Bulgaria

LAUNCHub, founded in 2012 with a fund of 9M EUR, actively invested pre-seed tickets of up to 200K EUR in 62 start-ups until the end of 2015. This generated another 20M EUR in follow-up funding in December 2016. The organisation is currently investing between 300K and 700K EUR in start-ups, but is however ready to invest up to 1.5M EUR in the right start-up.

SofiaTech is currently implementing a variety of projects in partnership with private and public institutions in order to become the first science and technology park in Bulgaria. The aim of the project is to facilitate the transfer and exchange of knowledge between academia and business to support start-ups and the upscaling of innovative ideas, thus boosting competitiveness, entrepreneurship and the commercialisation of new technologies, products and services in Bulgaria.

Source: <https://www.launchub.vc/> and <http://sofiatech.bg/en/>

To tackle the skills gap in Bulgaria, the strategy also includes actions to **build sustainable and effective links between higher education and the labour market, and to streamline the supply-and-demand chain for higher education specialists**. The strategy sets out to improve training content, institutional planning and admission systems by making better use of skills forecasts and labour market surveys, as well as promoting dialogue between HEIs and the business sector. To further increase the links between higher education and the labour market; the government also plans to fund student internships through offered through the Ministry of Education and Science's website.⁴¹

³⁹ MINISTRY OF EDUCATION AND SCIENCE (2014). *Strategy for development of higher education in the republic of Bulgaria for the 2014-2020 period*. Sofia: Ministry of Education and Science. Available at: <https://rio.jrc.ec.europa.eu/en/library/strategy-development-higher-education-republic-bulgaria-2014-2020-period>

⁴⁰ OECD & EUROPEAN COMMISSION (2016). *HEInnovate Reviews on Promoting Innovative and Entrepreneurial HEIs. Country-Level Review Bulgaria*. Prepared by the OECD in collaboration with the European Commission. December 2014, p. 5. Available at: <https://www.mon.bg/?h=downloadFile&fileId=7702>

⁴¹ See <http://praktiki.mon.bg/sp>

Measures to improve higher education and labour market links in Bulgaria

In recent years, the Bulgarian Ministry has taken a number of measures improve the links between the higher education and labour market systems. One of them was the establishment of an **inter-institutional expert committee** to assess the needs of the labour market in relation to the admission of specialists to newly opened professional fields and specialties from regulated professions in public universities for which there is no data on the completion of graduates and postgraduates. The committee is chaired by the Deputy Minister for Labour Market and Social Policy. Another measure is included in the evaluation procedures conducted by the National Evaluation and Accreditation Agency. The **definition of professional qualifications** of each educational degree now has to be based on analyses of potential jobs and studies at regional, national and international level with regard to the labour market developments.

This approach is also well **integrated within the Bulgarian University Ranking System**,⁴² which uses more than 100 different indicators against which universities can be compared. The indicators have been developed based on statistical data collected from different sources, including sociological surveys, and are grouped into 6 categories:

- Teaching and Learning;
- Science and research;
- Teaching and learning environment;
- Welfare and administrative services;
- Prestige; and
- Career relevance to labour market and regional importance.

The last category on Career relevance to labour market and regional importance looks at a number of different indicators, including: “Unemployment among graduates”; “Applicability of degree acquired and realisation at one’s chosen profession”; “Applicability of degree acquired”; “Contribution to the social security system”; “Graduates’ insurance income”; “Graduates’ taxable income”; “Ratio of graduates’ insurance income to the average salary for the region”; “Attractiveness of the university for potential students in the district”; “Attractiveness of the university for potential students in the region”; “Regional realisation”; “Regional realisation at a position requiring university education”; “Unemployment among graduates vs. the average unemployment rate for the administrative region where the university is located (ratio)”; and “Unemployment among graduates vs. the average unemployment rate for the administrative region where the university is located (difference)”.

⁴² See <http://rsvu.mon.bg/rsvu3/>

4 Context for the Bulgaria UBF

4.1 BULGARIAN PRESIDENCY OF THE COUNCIL OF THE EU: PRIORITY AREAS IN THE FIELD OF RESEARCH AND INNOVATION (JANUARY-JUNE 2018)

The Bulgaria UBF will focus on a number of key challenges and opportunities to improving university-business cooperation and modernising the higher education, research and innovation sectors as a whole. In line with the priority areas identified by the Bulgarian Presidency of the Council of the European Union in the field of research innovation,⁴³ two priorities in particular (which will be central to the EU's work under the Bulgarian Presidency from January until June 2018) are of high relevance to the three overarching discussion themes which will dominate this eighth edition of the UB Forum.

1. *Accelerating the transfer of knowledge, data and research results in support of a new generation of innovators and researchers*

At the heart of the Bulgarian Presidency's attention will be the “[o]ptimisation of knowledge transfer, uptake of research results and open access”,⁴⁴ which are seen as vital to fostering EU competitiveness and growth. The Presidency plans to adopt Council Conclusions on the need to accelerate knowledge transfer, including access to research results through open science policies on the part of businesses and wider civil society. By also proposing enhanced synergies between the Horizon 2020 Framework Programme and the European Structural and Investment Funds (ESIF), the aim is to ensure stronger economic and societal impact of research results on *all* regions in the EU. In addition, specific attention will be paid to ensuring and supporting the development of highly qualified human resources in research and innovation. Not only to raise the number of doctoral graduates, but also to make sure these graduates take up leading roles in businesses to drive the innovations of tomorrow. In this context, the Presidency will also pay attention to the issue of brain drain/brain gain, and the extent to which it affects Member States' human capital base.

2. *Maximising long-term sustainability of research infrastructures and opening up the industries and societies*

As highlighted in the previous Chapter, **investments in and sharing by businesses and universities of research infrastructures** are key to ensure first-hand knowledge transfer and the co-creation of innovative products and services to the benefit of the economy and wider society. To raise awareness about this issue of “physically” working together by universities and businesses on research projects, including the principle of “**opening up**” **research infrastructures** to input and participation from businesses and wider civil society (for example, through temporary exchanges and regular dialogue) are key to ensuring research results have an impact on and across regional, national and EU levels.

3. *Key Presidency events on university-business cooperation, research and innovation*

The present UBF will be the first of a series of **key events under the Bulgarian Presidency to “further explore opportunities for promoting public-private partnerships to increase inclusive participation, by providing the necessary platform for discussion on increasing the impact of R&I, in response to economic and societal needs and expectations, as well as globalisation”**.⁴⁵ As such, the discussions and outcomes emerging from this UBF will be key in setting the tone for any future work under the Bulgarian Presidency in the field of research, innovation and university-business cooperation.

⁴³ BULGARIAN PRESIDENCY OF THE COUNCIL OF THE EUROPEAN UNION (2018). *Research and innovation: Priorities of the Bulgarian Presidency of the Council of the European Union*. Presented 1 January 2018. Available at: <https://euagenda.eu/events/2017/12/15/research-and-innovation-priorities-of-the-bulgarian-presidency-of-the-eu>

⁴⁴ *Ibid.*, p. 1.

⁴⁵ *Ibid.*, p. 3.

Key events include:

- **University-Business Forum, Sofia, 22-23 February 2018;**
- Entrepreneurship Conference “Follow your ideas”, Sofia, 6 March 2018;
- ESFRI Steering Board meeting, 21 March 2018;
- Conference “Research Infrastructures”, Sofia, 22-23 March 2018;
- EIT Awareness Day, Sofia, 19 April 2018;
- Conference “Financial Instruments for boosting R&I”, Sofia, 13-15 of June 2018;
- Conference “Food 2030”, Plovdiv, 14-15 of June 2018;
- HEInnovate conference and seminar “Training the trainers”, Ruse, 14-15 June 2018.

4.2 BULGARIA UBF: KEY THEMES

The Forum will be opened with three keynote speeches by **Mr Kasimir Valchev**, Minister of Education and Science (Bulgaria), **Mr Jens-Nymand Christensen**, Acting Director-General (European Commission) and **Mr Andrey Kovatchev**, Member of the European Parliament. Following this, the UBF will provide an opportunity to discuss in more detail three important themes in parallel sessions which will be organised on the first day.

The first key theme covers the role of strong **leadership, management and governance** in driving university-business cooperation. The workshops under this session will look at what can be done to consolidate and improve management and leadership in the HEI sector. The first workshop will look at *good practice examples of management from the private and public sector*, and how these approaches might be transferred to the HEIs. The second workshop will showcase *good practice examples from the HEIs*, notably from institutions which have been successful at increasing and improving university-business cooperation by bringing about significant and sustainable changes in management and leadership practices.

In light of the R&I and UBC challenges outlined in the previous Chapters of this paper, participants are also asked to reflect on the following questions in relation to leadership, management and governance:

- Effective measures and approaches to increasing the **attractiveness, quality and effectiveness of doctoral education** to provide society with confident and highly skilled ‘innovation managers’;
- Effective leadership, management and governance practices in the public, private and research sectors which are successful at **driving ‘bottom-up’ university-business cooperation**: similarities, differences, complementarities and transferability?

The second session covering the theme of **driving regional innovation and development** also consists of two workshops, which will examine successful approaches of university-business cooperation and how they are boosting regional innovation ecosystems. The first workshop on *higher education for smart specialisation* will look at the critical factors universities, by facilitating both formal and informal interactions between faculty and students and local firms, can deliver at regional level to allow companies to increase their competitiveness through innovation: knowledge and human capital. The second workshop will examine this theme from a *transnational perspective*, namely by examining how universities and businesses are and can improve their cooperation in border regions.

In light of the R&I and UBC challenges outlined in the previous Chapters of this paper, participants are also asked to reflect on the following questions in relation to driving regional innovation and development:

- **The role of HEIs in society today**: what balance should HEIs be striking between striving for academic excellence and increased cooperation at international level and local engagement?
- Effective measures and approaches in research and education supporting the **formal and informal transfer and exchange of knowledge and human capital** between HEIs and local businesses.

The third key theme looks at **entrepreneurship education and development** in the context of the broader social debate on the need for universities and businesses to take up a stronger role in driving social, cultural and economic innovation. The first workshop will take a closer look at *entrepreneurship education*, exploring different examples and approaches to teaching and learning under this umbrella, including examples of how HE courses and curricula might be adapted to integrate entrepreneurial skills. The second workshop will focus on *social entrepreneurship* in particular. It will present and examine examples of how HEIs can cooperate with businesses and reach out to the community to solve problems faced by citizens and stimulate social cohesion, innovation and solidarity.

In light of the R&I and UBC challenges outlined in the previous Chapters of this paper, participants are also asked to reflect on the following questions in relation to entrepreneurship education:

- **Defining entrepreneurship**: the social and economic dimensions of entrepreneurship and creativity, and their role in higher education and research to supporting social cohesion and competitiveness;
- **Effective pedagogical approaches supporting the development of entrepreneurship, creativity and business / community engagement** at bachelors, masters and PhD levels, with a particular focus on interdisciplinary cooperation in STE(A)M – i.e. science, technology, engineering, arts and mathematics.

The second day will kick-off with presentations and discussions of the main conclusions emerging from the different parallel sessions. This will be followed by presentations and a panel discussion looking at the future of university-business cooperation in Europe, as well as support structures for start-ups and science parks in- or outside HEIs. The meeting will be closed by **Ms Antoaneta Angelova-Krasteva**, Director for Innovation, International Cooperation and Sport (European Commission).

The full programme is available on the conference website which can be consulted under the following link: <https://ubforum-bulgaria.eu/programme>

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