

Innovation and the Role of the University

The Case of the Republic of Korea

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Ambassador of the Republic of Korea to Bulgaria

Ceremony for Conferment upon him of Doctor Honoris Causa
of Sofia University "St. Kliment Ohridski"



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Honorable Rector of Sofia University “St. KlimentOhridski” Prof. Ilchev,

Honorable Dean of the Classical and Modern Philology Faculty Prof. Teofanov,

Excellencies,

Dear Guests,

I feel deeply honored to be conferred with the prestigious Doctor HonorisCausa of the Sofia University. I wish to express my heartfelt gratitude and profound appreciation to all members of the Academic Council of Sofia University who have acknowledged my efforts and contribution for deepening the comprehensive cooperation between Korea-Bulgaria, specifically for fostering the bilateral cooperation in education, science and technology. These efforts materialized in the successful projects and conferences carried out by the Korean Studies Center of Sofia University and the accomplishments of the Korea – Bulgaria IT Cooperation Center, which established the electronic administration system of the University.

Today I would like to use this humbling occasion to look into the future with you. Let me talk to you about “Innovation and the role of the university—the case of the Republic of Korea”, playing a key role for sustainable development.

The Importance of Innovation and the Current Status of Bulgaria

Sustainable development of every nation is based on innovation and is the only way forward for a market economy. There is no other way to stay globally competitive but to continuously innovate. Today, innovation is a necessity not a luxury. As Michael Porter from Harvard Business School says “Innovation is the central issue in economic prosperity.”

The World Bank and OECD say Innovate to Grow. Their collaborative research efforts show that innovation is critical not just for developed countries to sustain growth, but for emerging economies and developing countries to catch up with developed countries. Innovation has always been the key driver of economic growth. It is the way to become more competitive and reap productivity gains. The joint book by the WB and OECD actually uses the Korean growth experience as a role model of innovation in the development

process. In fact, Korea's catching-up with high-income OECD countries is strongly correlated with its innovative ability in fostering the technological content of its exports.

The OECD Innovation Strategy states that with the aftermath of the economic downturn, the world's societies face severe economic and social challenges. Innovation is crucial to boosting productivity and thus essential to recover from the economic downturn and thrive in today's highly competitive and connected global economy. It is a powerful engine for addressing and the development of social and global challenges.

In 2010 the European Council decided to adopt a common EU growth strategy Europe 2020, which is meant to establish EU as a smart, sustainable and inclusive economy. In order to accomplish this ambitious goal, the strategy identifies and sets five main objectives - on employment, innovation, education, social inclusion and energy. The EC has adopted a strategic and integrated approach to innovation whereby all relevant supply and demand policies are designed to contribute to innovation. Such an approach is meant to optimize synergies between and within different EU and national policies and ensure greater involvement of all stakeholders in the innovation process.

Bulgaria is no less affected by this global tendency. Recently, The World Bank issued a special report giving policy recommendations on how Bulgaria can pursue a smart growth strategy. The World Bank specialists are convinced that research and innovation can help Bulgaria to move up the value chain in industries that enjoy a comparative advantage as well as increase the share of high-tech exports, reinforcing the country's competitiveness.

Hence, the main challenge before Bulgaria is raising a R&D-intensive economy. The EC's Europe 2020 strategy, which Bulgaria is part of, demands for reaching the target of 1.5 percent R&D of GDP by 2020. Currently, Bulgaria has R&D spending of 0.48 percent of GDP, which is low in comparison to 1.85 percent of other European Union member states. A substantial increase in R&D spending is necessary to meet the 2020 target.

Although Bulgaria experienced significant decrease in innovation since 1990, measured by the number of patents, the trend has reversed the last three years. Most new Bulgarian innovations are in the high-tech industries, especially computers and communications. The many positive aspects in Bulgaria in recent years are as follows;

1. Emerging of Bulgarian multinational companies
2. Outsourcing of R&D departments of multinationals to Bulgaria
3. Increasing private investment in R&D, now 15% greater than public investment.

(In 2010 private investment amounted to 210 600 mlnleva and the public to 157 132 mlnleva)

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4. Bulgaria has great internet, better access than in most developed countries
5. Increase of civil activity through internet and social networks

The case of the Republic of Korea

Korea has performed exceptionally well over the past decades, successfully catching up with the world's leading economies and incentivizing a series of industrial upgrading, establishing itself as a world leader in some of the most high-tech industries. Innovation – with the adoption and adaptation of imported technologies – played a key role in its efforts to catch up with the leading OECD economies.

In four decades, the Republic of Korea has transformed itself from a poor agrarian economy into one of the global industrial leaders. Korea's industrialization evolved from imitation to innovation. Even the early stages of imitation involved significant amounts of technological and organizational innovation. The periods of innovation involved developing and securing leading-edge value-added technologies in promising areas – IT and communications, biotechnology, nanotechnology, health, environment, space development, oceanography, nuclear energy. A great example of innovation-driven success is the market boom by Samsung Electronics, whose Galaxy S series armed with leading edge technological innovation passed the 100-million record sales in less than 3 years. Rightfully competing in the smart phone industry previously dominated by iPhones and Blackberries, the company attributes its success to “two decades' worth of innovation and technology development”.

To summarize the set of policies and strengths of the Korean government on innovation systems, we have to name:

- Strong, mobilizing national vision and planning built on consensus and consistency in consecutive governments;
- Increasing investments and strong government support for innovation and R&D;
- Good and improving framework conditions for innovation;
- One of the highest ratios of gross domestic expenditure on R&D;
- Significant business enterprise expenditure on R&D;
- Highly educated workforce;
- Good supply of human resources for science and technology;
- Ready early adopters of new technologies;
- Strong ICT infrastructure with high levels of mobile users.

Korea has a firm commitment to large investment in S&T innovation and that strategy has

undoubtedly underpinned much of its recent economic growth. R&D expenditure has grown rapidly in recent years and Korea is now among the OECD leaders in terms of R&D intensity. In 2011, the total R&D budget of Korea amounted to EUR 35,2 billion. It represents 4.03% of the GDP and shows increase of 0.29% against the background of general economic downturn. 73.7% or EUR 26,0 billion of R&D investments come from private companies. 26.1% or EUR 93 million are state funds, which, compared to EU member states, shows that private funding prevails. Compared with Europe, whose target to reach 3% of GDP by 2010 was not achieved, Korea is a global leader. According to preliminary estimations of World Bank, IMF and specialized editions, in 2012 Korea spent EUR 42,2 billion on R&D or 3.4 % of its GDP and ranks 5th in the world. The Korean Government has consistently followed a policy of promotion of private investments in R&D through adequate national research and innovation systems, as well as a highly increasing ratio of government expenditure on R&D each year. The private sector was encouraged to engage in technology development through tax incentives, financial provisions, public procurement and S&T-related infrastructure. As a result of policy instruments by the government, the number of corporate in-house R&D centers has increased from 13,324 in 2006 to 21,162 in 2010. Amongst them, the number of in-house R&D centers in SMEs has also increased from 12,398 in 2006 to 20,047 in 2010.

The role of education is crucial for the development of technological progress and Korea is no exception to that rule. In the 2011 State of the Union Address President Obama used Korea as an example of a nation that understands how central the role of education is for sustainable development – “In South Korea, teachers are known as “nation builders.” Throughout Korea’s industrialization process, a supply and mobilization of qualified S&T human resources has been the cornerstone of industrial and S&T policy. These efforts saw a massive expansion in tertiary education, with new universities and colleges opening doors all around the country. Korea has ensured that virtually all students complete secondary education and has moved towards tertiary education, with more than 80% of young Koreans attending university or college, the highest level in the world and by large the largest proportion in the OECD area. The proportion graduating with science and engineering (S&E) degrees is also the highest within the OECD. Education is the root of Korea’s model of knowledge economy which raised the country from a poverty-ridden to the 12th economy in the world in only four decades.

Innovation has always been central to the Korean development model, built on the changing global context and growing competition. The key challenge for Korea is to create an innovation system that enables its leading firms to remain at the world technology frontier, while encouraging greater innovation in other sectors of the economy. Continued support for the development of capabilities and research infrastructure in universities and more

strenuous efforts to diffuse knowledge from the public to the private sector is important.

Collaboration between public, private sector and university

A crucial element of the rapid development of innovation world-wide has been the cooperation between business and educational institutions. Combining business's financial resource and the science community intellectual resource breeds inventions which not only contribute to expansion of knowledge but also yields profit. A good example of synergy between business and education is the Samsung Medical Center - a hospital and a cancer center, which for more than 10 years already, provides 100% scholarships to top Korean students, studying medicine or doing medical research.

In the same manner, one of the largest Korean steel companies, POSCO funded POSTECH - the first research-oriented university in Korea, established in 1986. With more than 11 000 graduates, POSTECH has contributed to science and technology development through projects such as the development of the world's first AIDS DNA vaccine and the world's tinniest nano-line.

The OECD Forum on Eco-Innovations held in Korea in 2012 outlined The Environmental Technology Business Incubator as one of the best examples of incubator policies supporting environmental venture companies with high potential. In its 2012 S&T Outlook the OECD recognizes the value of government measures aiming to improve commercialization and knowledge transfer from public sector research. These include the Technology Holding Company system, which promotes the establishment of venture businesses by universities and research institutes, as well as the Leaders in Industry-University Programme (LINC) and the Brain Korea Programme (BK), both of which seek to improve the industry-academia collaboration.

Apart from cooperation between business and education, international knowledge dissemination and exchange is a fundamental contributor and a catalyst of innovation. To this end, the Korean Institute for Science and Technology (KIST) has established the International R&D Academy, with the goal of training and educating prospective scientists and engineers from developing countries. The International R&D Academy grants full scholarships to skillful scientists, in this way transferring knowledge to developing countries, specifically: accumulated Korean experience in R&D, commercialization of innovative technologies and R&D management skills. Within my capacity as an Ambassador in Bulgaria, I have tried to secure 5 scholarships to promising Bulgarian students.

In a globalized context no country alone can make a great scientific and technological breakthrough. Over the years, Korea has pursued active international exchanges with third countries and organizations focusing on securing advanced national research capacity and

putting added value to integrated research programs. To mention just a few, Korea has developed and maintained excellent relations with the European Organization for Nuclear Research (CERN), Japan Proton Accelerator Research Complex (J-PARC); Max Planck Gesellschaft in Germany; France's Institute Pasteur and its branch in Korea in the biotechnology field ranging from genome research to new drug development for major diseases with advanced technologies.

Collaboration between Korea and Bulgaria

Of course the bilateral cooperation and exchange of knowledge between Korea and Bulgaria is also flourishing, especially with Sofia University. There are plenty of successful projects carried out in collaboration between Sofia University and Korean institutions. The Center for Korean Studies, under the leadership of Professor Fedotoff, is active in research and analysis of Korea-related studies under the patronage and financial support of the Ministry of Foreign Affairs and Trade. Considering the successful record and with the ambition to one day designate the Sofia University "St. KlimentOhridski" as a potential hub center for Korean studies in Eastern Europe, the Incubation Academic Project was started with the financial support of the Academy of Korean Studies. This project is jointly implemented by Sofia University "St. KlimentOhridski" and Sung Kyun Kwan University of Korea, where the joint academic conferences highlighted the literature, lives and works of those under foreign occupation in Bulgaria and Korea in a comparative analysis. On February 15, this year's joint conference between the two universities will be held in Sofia Univeristy. Furthermore, the Center of Korean Studies can venture off to other areas ranging from political economy, economic development, law or even IT in hope to expand inter-faculty and inter-disciplinary joint research aiming for innovative insights through the convergence of different departments.

Another significant successful cooperation between Korea and Sofia University is in e-government. In September 2010 the Korea-Bulgaria IT Cooperation Center was established in Sofia University, aiming at the transfer of know-how and innovative IT solutions in line with the strategy of the Bulgarian government to establish e-government. It also strives to provide advanced consultancy to all interested stakeholders – government, business and citizens. The IT Cooperation Center, a collaborative structure between the National Information Agency of the Republic of Korea and Sofia University, introduced electronic services to all members of the University. Next month all of you will have the chance to discover what the ITCC has accomplished and all its plans for future collaboration during the ITCC forum in Sofia.

Looking into the future, another prominent idea for cooperation between Korea and Sofia University, is in e-learning. Sofia University has renowned specialists in the field and Korea is a world leader in e-learning technology and implementation. The collaboration in e-learning will begin during the ITCC forum in April, where specialists from both countries will exchange know-how and build future plans. Furthermore, The Genome Centre of Sofia University is currently in negotiations with counterparts in Korea interested in genome and stem cell research and hopefully will soon see fruitful discussions of a joint project.

Concluding Policy Recommendations

As seen by the Korean experience, innovation is crucial to achieve sustainable development. Bulgaria has to undertake an integrated approach, where government, business, international organizations and institutions all work together to achieve synergy and reach the goal of supporting and developing innovation. There are a few policy recommendations drawn from best international practices and based on the current status of Bulgaria's technological achievements that could make a big difference in Bulgaria's innovation strategy.

1. To meet the national target of 1.5 percent R&D/GPD by 2020, and to improve competitiveness on the global market, Bulgaria has to increase absorption of EU funds and expand R&D government spending. Furthermore, the expenditure should be well targeted, prioritizing sectors with greatest potential. The principle of *selection and concentration* should be applied. The successful institutions and projects should be nurtured and further stimulated in order to improve their global competitiveness.
2. EU funds are the main source of fresh public funds for upgrading and modernizing Bulgaria's economy. It is much more efficient, however, if funding is allocated competitively. This system should be based on specific amounts of money being allocated for a concrete sector or type of project. Institutes, universities and all kinds of researchers should compete for the funding where the best bid wins. International and particularly Korean experience shows that competitive funding is better at promoting excellence in research and increasing collaboration among research institutions.
3. Some emerging high-tech countries such as Korea have established anti-cyclical R&D spending policies, something Bulgaria could consider. By spending more on innovation when the economy is in a decline, Bulgaria could boost productivity when it is needed most. This policy has proven to be very successful in assuring the continuity of scientific and innovation activities.
4. The government could incentivize the private sector to finance innovative ideas and products. International experience shows that the business needs to be an active partner in developing innovation. The most innovative countries such as Germany, Finland, and

Sweden have the highest share of private spending, with about 65% of total R&D funded by private firms. In Bulgaria private R&D is only 30% compared to public at 70%, which seems as a disadvantage compared to the most successful countries.

5. With that goal in mind, the government needs to improve and provide good frameworks for innovation. The private sector should be encouraged to engage in technology development through tax incentives, financial provisions, public procurement and S&T-related infrastructure. The Korean experience shows that this is an impeccable strategy.
6. Encouraging knowledge commercialization is a golden strategy for developing some self-reliance in the S&T sphere.
7. Bulgaria needs to establish a solid legal and institutional framework for the cooperation between business and education, especially in terms of allocation of financial resources.
8. To substantially increase innovation greater international collaboration has to be encouraged. Attract foreign companies willing to outsource their R&D departments in Bulgaria. Partnerships between local researchers and R&D teams working in foreign companies or institutes could greatly impact the performance. The recent positive trend of innovation in Bulgaria is mainly driven by collaboration with large companies from Western Europe, the United States, and Japan. To incentivize technological development, the government could stimulate international R&D collaboration. In that way, Bulgarian researchers and companies will have the opportunity to cooperate with leading inventors on a global scale.
9. It is apparent that the pharmaceutical and IT are the leading innovative industries in Bulgaria, which is why it is advisable that their development be accelerated. Again in respect to this recommendation a stronger partnership between the firms and the educational institution would yield more highly-qualified specialists.

As the World Bank insists, Bulgaria's competitiveness challenge is to "grow smart", which means making research and innovation one of the major drivers of economic growth. In this context, what kind of role should the university play? The university's responsibility is to create and develop human capital and playing an integral part of the synergy between private and public sector, collaborating with them to develop cutting edge insight to some of Bulgaria's highly competitive industries. Knowledge is the engine of economic growth and progress. Universities together with government and business must work together to bring new technologies and innovation to market. It should create academic environments that facilitate and encourage students and faculty to engage in value creating innovation. There could be no innovation without education and research. As Steve Jobs says "Innovation distinguishes between a leader and a follower." If Bulgaria wants to be competitive and even turn into a global trend setter, innovation should be its primary focus.

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Additional Information

The Samsung Medical Center was founded on November 9, 1994 under the philosophy of "contributing to improving the nation's health through the best medical service, advanced medical research, and development of outstanding medical personnel." The Samsung Medical Center consists of a hospital and a cancer center. The hospital is located in an intelligent building with floor space of more than 200,000 square meters and 20 floors aboveground and 5 floors underground, housing 40 departments, 10 specialist centers, 120 special clinics, and 1,306 beds. On the other hand, the 655-bed Cancer Center has 11 floors aboveground and 8 floors underground, with floor space of over 100,000 square meters. SMC is a tertiary hospital manned by approximately 7,400 staff including over 1,200 doctors and 2,300 nurses.

For more information, please visit: <http://www.samsunghospital.com>

POSTECH, founded by one of the largest Korean companies POSCO, is the first research-oriented university in Korea, established in 1986. With more than 11 000 graduates, POSTECH has contributed to science and technology development through projects such as the world's first AIDS DNA vaccine development and the world's tinniest nano-line development. As a research-oriented university, POSTECH believes in keeping a strong alliance of academics, industry, and research with other industries and research centers, including POSCO and Research Institute of Industrial Science and Technology (RIST). Today, POSTECH has grown into one of the world's leading science and technology research-oriented universities. Its 3,000 students, 800 researchers and 240 faculty members

represent the brightest minds studying and researching on a large 165 hectare campus with state-of-the-art facilities located on the southeastern coast of Korea.

For more information, please visit: <http://www.postech.ac.kr/>

KIST Korean Institute for Science and Technology, founded in 1966, is a premier multi-disciplinary research institute in Korea. Their goal is to research, develop, and transfer creative, original technologies that are necessary to advance our nation's science and technology base. The primary focus is on fusion technologies that will power Korea's economic growth, especially in the areas of the environment, energy, health, security, and materials. KIST proactively fosters partnerships among industries, universities, and research institutes. It is only through such cooperation that we can improve the well-being of our citizens.

For more information, please visit: http://eng.kist.re.kr/kist_eng/main/

Brain Korea 21 (BK21) program is a major higher education reform project initiated by the Korean government to prepare Korean human resources for the 21st century. 'Brain Korea 21' (BK21) aims at fostering world-class graduate schools and high quality scholars by providing funds to higher education institutions. Brain Korea 21(BK21), plays an important role of specializing and enhancing the research capacity of regional graduate schools, thereby tries to develop regional R&D personnel clusters in local industry, that should bring up human resources of professionalism and excellence, the major driving force in each country's pursuit for a global economy and advantage in international competitions.

For more information, please visit: <http://bnc.krf.or.kr/home/eng/bk21/aboutbk21.jsp>