Science, Technology and Innovation in Kazakhstan

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Distinguished Participants,

Ladies and Gentlemen,

It gives me a great pleasure to address this august gathering on the occasion of the Innovation Congress of the VIth Astana Economic Forum under the auspices of the Eurasian Economic Club of Scientists Association organized in cooperation with the Ministry of Economic Development and Trade of Kazakhstan.

The Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC) is a subsidiary organ of the Organisation of Islamic Cooperation (OIC) operating in Ankara, Turkey, since 1978 as the main economic research arm, statistics centre and training organ. The Centre has been engaged in statistical data collection, collation and dissemination on and for the member countries, undertaking the preparation of research papers, reports and studies on various economic cooperation and development issues, organizing training programmes on subjects of immediate interest to the member countries, triggering technical cooperation among various partners from member countries, and putting out periodic and other publications in its areas of mandate.

Our report titled *"Science, Technology and Innovation in Kazakhstan"* is a country case study under the framework of the Atlas of Islamic-World Science and Innovation (AIWSI) project, which is an international attempt that aims to provide an insightful overview of science and science-based innovation across the Islamic-world, an independent and authoritative assessment of how these capabilities are changing, and analysis of the opportunities and barriers to further progress across the selected countries of the Organisation of Islamic Cooperation (OIC).

It does not aspire to be a comprehensive analysis of every sector, but maps key trends from which policymakers, universities, business leaders and other stakeholders will be able to drill down into more detail. As part of the analysis, a priority of the country reports is the consideration of the changes that need to be made in the light of international best practices so that the country's current policies to promote science, technology and innovation can be modified and enhanced, where relevant. Smart examination of current stance of countries is a key output of the Atlas Project, but an equally important feature is its focus on building capacity, as well as catalysing new partnerships and collaborations. Opportunities for capacity building and inspiring new partnerships will be considered at OIC and national levels, being sensitive to different dynamics of national policy-making systems.

The Atlas Project is co-managed by SESRIC and the Royal Society of the United Kingdom. It is a unique partnership supported by international partners such as the Islamic Development Bank (IDB), the British Council, International Development Research Centre (IDRC), Islamic Educational, Scientific and Cultural Organization (ISESCO), Ministerial Standing Committee on Scientific and Technological Cooperation (COMSTECH), Nature, OIC General Secretariat and Qatar Foundation (QF).

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Ladies and Gentlemen,

In collaboration with the Ministry of Industry and New Technologies, and the National Agency for Technological Development JSC of Republic of Kazakhstan (NATD), the country case study of Kazakhstan has been finalised very recently. The report analyses the state of science, technology and innovation (STI) in the Republic of Kazakhstan and provides an assessment of how effectively the existing national innovation system (NIS) develops and supports the country's innovative capabilities. Getting its independence in 1991, Kazakhstan is a former Soviet Union Republic with rich natural resources. Although the Soviet Union era has left Kazakhstan with a powerful scientific heritage in basic sciences, the long period under the Soviet central planned economy with dominance of state-owned companies slowed the efforts of the country to become an innovative society. The report makes use of the outcome of three in-country fieldworks visits that took place in June 2011, and February and May 2012. During these visits, the SESRIC research team made interviews with high level policy

makers, collected data and conducted questionnaire with the participation of more than 100 scientists, experts and business leaders.

As a country with abundant natural resources, Kazakhstan is still facing challenges in transforming into a knowledge-based economy. The strong heritage of basic sciences which the country gained during the Soviet era could be a positive factor in distinguishing Kazakhstan from the other former Soviet Union republics in the region, if supported by a well-built culture of entrepreneurship.

The main strength of Kazakhstan is the support for STI at senior levels in the government. The government of Kazakhstan has issued many decrees for the creation and implementation of the National Innovation System (NIS). Currently, most of the existing rules and regulations are oriented towards technological research and innovation. Yet, the government of Kazakhstan should consider non-technological forms of innovation as well, since these kinds of innovations are also critical for the overall performance of the economy. To maintain the sustainability of research programs, it is necessary to increase the demand for innovation from all the sectors of the economy. Kazakhstan needs to improve the efficiency of know-how generation in several sectors such as government, business, science and education and overcome the fragmentation within the innovation infrastructure.

R&D expenditure per capita is an important indicator of the scientific and technical potential of a country. Among OIC member countries, only Turkey with $132 and Tunisia with $103 have per capita levels above one hundred dollars. They are followed by Gabon with $92, Iran with $89, and Malaysia with $79. In Kazakhstan, The R&D Expenditures per capita is $27, which is slightly below the OIC average of $30. The government of the Republic of Kazakhstan has adopted a wide range of policies and made substantial investments in support of innovation. For instance, plans for increased spending on innovation by large state companies may provide new impetus, including the decision to allocate 10% of the net profit of Samruk-Kazyna, National Welfare Fund, on innovation-related projects. In 2011, the total amount of funding for science was around US$ 134.3 million and the proposed budget for 2012 is around US$ 285 million. Kazakhstan intends to increase its expenditures on research and development as percentage of GDP to an average of 1% by 2014. Over the past eight years, Kazakhstan has recorded some positive trends on main indicators of innovative activities. For instance, with around US$ 227 million, R&D expenditure increased in absolute

terms by almost 3 times in 2010 compared to the level of 2003. With around US$ 964 million in 2010, the volume of innovative products has increased 2.1 times compared to the level of 2003. Since the country's independence in 1991, the share of research activity of local scientists in international publications increased by 3 times. As a result of the recent global financial crisis, like many other countries, Kazakhstan revised its science and technology policies and enacted a number of government initiatives and measures for ensuring the sustainability of science and technology projects. As a result, the demand for grants for the acquisition of technology has doubled in 2010.

As for the opportunities to be exploited, the R&D activities in the oil and gas industry are necessary to increase the efficiency of exploration work; there is a need for technologies aimed at the discovery of new fields in mining. Biotechnology sector is an emerging area for further cooperation and advancement and the special strength of Kazakhstan is the development of veterinary drugs. The Space Programme is among the areas, which Kazakhstan can stand out as it has inherited an extensive space legacy from the Soviet Union, though the Baikonur Cosmodrome, the first and biggest among its kind, located in the country, can neither be maintained nor developed alone. Kazakhstan has already started building its own space centre close to Astana, and these facilities could be upgraded to improve satellite launch and space vehicle technologies.

The most important source of future economic growth of Kazakhstan is its high potential of rich natural resources, which not only provide the bulk of domestic demand for raw materials and oil, but also forms a large part of its foreign exchange earnings from exports. Currently the total capacity of the existing three refineries is at the level of 13.5 million tons. This will become insufficient in the long term. Nevertheless, despite all these measures, fuel supply issue can be solved only after the reconstruction of more national refineries. Kazakhstan has a vast territory with a large agricultural land area. Despite the severe conditions in many regions of the country, the territory of Kazakhstan with a large amount of virgin land area offers opportunities for organic farming. The different climate zones offer an opportunity for a large variety of crops that can be cultivated. More resources should be reserved for the development and transfer of new agricultural technologies.

The need to increase domestic demand for innovation, to diversify the concentration of economic activity, to structure a comprehensive strategy for Human Capital Development,

and to establish and strengthen a tradition of commercialising research are among the key areas that need to be given special attention. A major challenge for innovation policies in Kazakhstan is the weak domestic demand for innovation. In this context, one way of overcoming this obstacle is to enter foreign markets with a high demand profile for innovative products and diversify and reach new target markets other than Russia and China.

Considering all of these factors, it is not surprising that high-technology exports (HTE) are very low in the member countries. In 2010, OIC as a group, exported $73 billion worth of high technology products, which constituted 4.2% of the world HTE of $1.7 trillion. 81% of the total HTE of OIC is undertaken by Malaysia with an annual volume of more than $59 million. This also secures Malaysia to rank as the 10th largest exporter of high-technology products in the world where, on the other hand, none of the OIC member countries exceeded the threshold of $1 billion except Indonesia ($6.7 billion), Kazakhstan ($2.1 billion) and Turkey ($1.7 billion). This lack of diversification further highlights the need to broaden the country base of high technology.

Export of raw materials plays an important role in the Kazakh economy. This sector fuelled the steady growth in the last decade and attracted large foreign investments into the country. While 60% of the total investments were made in oil and gas industry, investments in power, ferrous metallurgy and food industry constituted only about 8%. Such an unsustainable pattern of investment in fixed assets is primarily due to the quick and high return on investment in raw material sectors. Currently, the scientific and technological developments in the priority sectors of the economy are concentrated in large state enterprises and private entities. The statistics show that 10 organizations accounts for the majority of the revenues and innovative activity in the oil and gas industry, which make sense as a short-term and medium-term strategy in order to set country in a direction, but there should be a flawless exit strategy such as privatization of state companies or breaking-up of conglomerates.

Kazakhstan is becoming part of the global economy; therefore the formation of macro-economic policies in Kazakhstan should consider the challenges of globalization, financial instability and increased competition in the international markets.

Having adequate number of highly qualified human resources is the primary condition to foster innovation and promote the scientific and technological development of a country. In

the world, there are 1549 researchers per million people whereas OIC average (457) is even less than one third of this number. Yet, six of the 37 Member Countries with available data have above 1,000 researchers per million people: Tunisia (3240), Jordan (1934), and Turkey (1715), Iran (1491), Azerbaijan (1218) and Egypt (1018). Meanwhile, there are 637 researchers per million people in Kazakhstan. After the independence, Russian scientists returned to Russia, and thus, Kazakhstan faced critical issues associated with staffing in different science fields; statistics have recently shown an increasing trend with 10,870 people engaged in R&D in 2010, corresponding to a 7.7% increase over 2009. The lack of a significant number of people with entrepreneurial skills is a restrictive factor in regards to bringing potentially high-return ideas/projects into the market. Hence, it would be wise to consider emphasizing entrepreneurship and management education for students.

Independent research organizations and institutions of the Republic of Kazakhstan are one of the major historical features of the National Innovation System. R&D related organizations increased from 257 in 2000 to 424 in 2010 corresponding to a striking growth rate of nearly 65 % in a decade.

Nevertheless, Kazakhstan has inherited the old system of science and education after the collapse of Soviet Union. In that system, research is concentrated mainly in a state body, most of the R&D activities aimed at solving industry problems are carried out at the large public research centres, and large R&D institutions remain in the form of public ownership and are funded from the state budget. Even after promising scientific results, entrepreneurs face challenges in commercializing new inventions because of inexperience in intellectual property rights (IPR). The government should consider simplifying all aspects of the commercialization, and provide all the support for the entrepreneurs for turning their research output into economic products. Beyond proxying innovation capability of a country, patents strengthen the link between science and technology. In 2010, OIC Countries made over 33 thousand patent applications that accounted for only 1.7% of the 1.98 million patent applications worldwide. Among them, Iran (6527), Malaysia (6463), Indonesia (5638), Turkey (3357), Egypt (2230), Kazakhstan (1989), Pakistan (1365) and Morocco (1034) are the only countries with applications above 1000. Meanwhile, 73.5% of the global patent applications came from five countries, namely: USA (24.8% with 490 thousand), China

(19.8% with 391 thousand), Japan (17.4%, 344 thousand) and Republic of Korea (8.6%, 170 thousand) and Germany (3%, 59 thousand)

Kazakhstan has the opportunity and potential to improve its capacity to innovate, and join the world leaders in innovation. Towards achieving this, Kazakhstan should ensure the effectiveness and coherence of all the constituent elements of the National Innovation System. Ensuring free market economy with a dynamic innovation capacity requires not only sound government policies and tools, but also private sector initiatives. Being a young market economy, Kazakhstan has strong potential, and should give special attention to effective partnership between public and private sector for generating an environment favourable to a functional knowledge-based economy.

Although the government gives special attention and high priority to increasing the capacity of the country in STI, there is still room for improvement through the participation of all stakeholders in STI legislation process by avoiding the top-down approach, and considering the needs of the market. An important component of national STI systems in this highly globalized world is international cooperation, and as indicated in our Report, special emphasis should be given for an efficient identification of the potential areas for such cooperation.

Distinguished participants,

Ladies and Gentlemen,

SESRIC, with its vast experience in initiating cooperation and collaboration across the Member Countries of the OIC, has also taken necessary measures in supporting the implementation of the outcomes of the Kazakhstan STI Report. In this context, the Memorandum of Understanding signed between the SESRIC and the National Agency for Technological Development JSC of the Republic of Kazakhstan (NATD) in October 2012, is a significant move that emphasizes the importance of working more closely with OIC Member Countries and other international organisations, so that we can all better address the demands of the future in the field of STI. This MoU is an important step in strengthening that cooperation and enhancing the flow of information on science and technology innovation policies. An important lesson we learned from the Kazakhstan Country Report was the need for Kazakhstan to be better connected to and engaged with the international community and

Islamic Countries. Our aim is to ensure that this MoU provides practical ways for Kazakhstan to improve information sharing and coordination with other Member Countries in reconnecting Science and Policy.

Finally, I would like to thank the Ministry of Industry and New Technologies, and the National Agency for Technological Development JSC of Republic of Kazakhstan (NATD) for giving us this opportunity to present the outcomes of the Kazakhstan Country Report here at this Innovation Congress. I would also like to thank the Eurasian Economic Club of Scientists Association and the Ministry of Economic Development and Trade of Kazakhstan for organizing this glamorous meeting.