



# Realities of Science and Technology Policy Development in Mongolia



**Amangul Shugatai\***

## Introduction

The science, technology, and innovation's development uses to strengthen and improve cooperation among countries (Bridget M. Dolan, 2012) in investigating key roles to the economic development of a country as well as its fostering competitiveness of the science, technology developments in the world. Recently, common features of international development is to build an economy which is based on creating, promoting and using a science and technology. Over the last 30 years, scientific and technological development has been experiencing low growth rates in Mongolia. This is due to the lack of policy and organisational co-operation in the science and technology sector and the lack of initiative in introducing the results of research and practice to cognitive. (Science Technology Foundation 2019).

The present era is talking about the fourth industrial revolution in the age in which we live. Science and technology innovation achievements are measured in minutes and seconds. Therefore, science and technology policy needs to aim at establishing a system with constant monitoring and evaluation to improve Government investment efficiency in science and technology sector. (Duger 2019). Science and technology is not just a knowledge producer and riches of the society. It is also one of the basic foundations of development of a State (Duger 2019). With the knowledge gained and the introduction of innovation in life, the competitiveness of Mongolia will be enhanced by creating new ones. So, we must pay attention in this direction.

Mongolia has founded the system basics to develop industrial scientific knowledge, transform acquired knowledge into new technology, products and services. The Government of Mongolia is putting great emphasis in the scientific policy making by highlighting and storing National innovation system. Science policy focuses primarily on promotion of "knowledge-generation" centers, creating an efficient national innovation system (MECSS 2007).

---

\* Research fellow, Regional Studies & International, Organization Department, Institute of International Affairs of the Mongolian Academy of Sciences, Mongolia.

The Science, technology and innovation policy is directed to develop national science system to promote Science“ *mission of the Master plan is to enhance the Science and technology capacity, increase the innovation system effectiveness, promote the Industry-Academia collaboration, contribute to the economic growth by establishing an enabling social, economic and legal environment, establish a basis for national technology development, promote the growth of high technology based industries, and establish foundation for knowledge-based economy*” (MECSS 2007).

Today, one of the biggest problems in science, technology and innovation development of Mongolia is financing or funding problems. Last two decades, Mongolia’s national scientific capacity has not grown and hence it could not contribute to the development of the country. This situation stems from the neglected policy of the state in the field of science for more than 20 years (Duger 2019). According to the government statistics the science, technology and innovation sector only 0.35 per cent or MNT 4605.7 million of general government budget an annual (Science Technology Foundation 2019). The National Science Technology Foundation of Mongolia spend it 90 per cent and which of 30 per cent spend to Mongolian Academy of Sciences and agricultural sector 20 per cent, technology sector 17 per cent, medical field about 12 per cent and the rest are in other branches and organizations. Thus above mentioned statistics shows sector funding is too low in Mongolia. It shows state budget is too low for academic institute and research universities which means our country’s science, technology and innovation finance is much lower than other countries. For instance, Budget and investment for research development in Mongolia 10 times lower than in other developing countries. For example: Japan spends 3.14 per cent or \$ 165 billion, Austria with 3.1 per cent or \$ 12.1 billion, and China with 2.1 per cent and \$ 451.9 billion, Mongolia spends 0.12 per cent or \$ 15 million, South Korea 4.29 per cent, \$ 92 billion, Sweden 3.26 per cent, \$ 16.7 billion, Finland 2.74 per cent, \$ 7.0 billion share of the GDP from the national budget to science technology sector (Science Technology Foundation 2019). Therefore, insufficient budget or funding for this science, technology and innovation also weakens the development of Mongolia’s foreign science

diplomacy cooperation.

Therefore, the Government of Mongolia is seeking to increase government support for science and technology from 2020. If state budget funding increases for science, technology and innovation branches in 2020, Mongolian academic institutions and scholars in this field will begin to work more effectively and improve science technology and innovation collaboration will deepen our future cooperation. There is an urgent need to expand scientific co-operation for science technology development. As part of Mongolia’s foreign science cooperation, it has been cooperating with the Government of Japan, the Asian Development Bank and the World Bank, international donor organisations, like International Foundation for Science, International council of Science, The World Academy of Sciences, United Academy of Innovation, Centre for Science and Technology of Non-Aligned and other Developing Countries, NAMS&T Center (Mongolian Academy of Sciences 2019), the Russian Intergovernmental Foundation for Science, the Chinese Science Foundation, South Korea and Japan’s Funds. With the help of the above organisations, researchers from partner countries are implementing joint projects. This is a project from developed countries where our scientists are working hard to introduce new innovation in Mongolia and joint innovation. Although, Mongolia is a small nation with a population of 3.18 million (National Statistic Database 2019). Unfortunately, science diplomacy and collaborations are not being implemented effectively in Mongolia. Today, Mongolian science technology collaboration is actively cooperating with Russia, China, Japan and Korea. However, Mongolia’s cooperation with developed countries in the West and other Asian countries in which science and technology are well developed is inactive. For example: the Mongolian Academy of Sciences cooperates with India in the framework of scientific and technological cooperation with the following four organizations: Council of Scientific and Industrial Research, Indian National Science Academy, Avinashilingam, University, Uka Tarsadia University (MAS 2019). However, above mentioned four organizations made a collaborative agreements inactive following two organizations. Council of Scientific and

Industrial Research, Indian National Science Academy. The agreement and memorandum are discussed to expand cooperation between the two countries in the following areas: studies of medicinal and aromatic plants of Mongolia, microbial resource inventorisation, genomics, patent informatics, R&D planning, prioritisation, and project formulation, leather bioprocessing. Through its ITEC courses, it has partnered with the Indian Academy of Sciences to improve the English language skills of young researchers (Mongolian Academy of Sciences 2019).

Mongolia, therefore, will be able to achieve sustainable development in the field of science and technology as it adapts to its specifics, develops policy in the field of science and expands its cooperation with foreign countries. In this article, we will try to cover the situation in the field of science policy implementation in Mongolia.

## Current Situation of Science Technology Sector of Mongolia

According to Asian Development Bank report: Chronic underinvestment has impeded the growth of Mongolia's Science, Technology and Innovation, since the early 1990s, after the country transitioned from a centrally planned to a market-based economy (ADB 2017). In 2015, gross domestic expenditure (GDP) on Research and Development expressed as a percentage of the gross domestic product was 0.16 per cent lower than in 1990 (1.0 per cent). This compares unfavorably with the Organisation for Economic Co-operation and Development countries (1.0 per cent - 4.2 per cent of GDP). The number of research development personnel (2,515 in 2015) has also been in gradual decline since the mid-1990s (3,102 in 1995). The main cause of stagnation is that Science, Technology and Innovation in Mongolia has not been well integrated with other related sectors (ADB 2017:1). Its contribution to the economy, in particular the diversification of the economy, and standards of living, through knowledge and technology transfer and commercialization of research and development has been insignificant, which has led to years of neglect (ADB 2017).

The national innovation system in Mongolia is characterised by weak knowledge dissemination, limited technology transfer, and infrequent

commercialisation of researcher and development that stem from following main factors are influencing (Paavola 2019). Institutional arrangements for science technology and innovation are fragmented. Although the Ministry of Education, Culture, Science and Sports (MECSS) is responsible for formulating and implementing science, technology and innovation policies and directly supervising some of the 59 research institutions and 21 research-based universities (MECSS 2019), about one-third of public and private research institutions are supervised by other ministries (Science Technology Foundation 2019)

There are about 4300 people (MECSS 2019) in the Science sector of Mongolia and, while 10 are under the Mongolian Academy of Sciences and working staff number is 2283 people working on STI sector (Science Technology Foundation 2019). Currently, there are 65 public and private research organizations. In Mongolia, the number of researchers per million is about 549, which is three times less than the world average. Last year, MNT 36 billion was spent on this sector, which is 10 times lower than the Asian average and 14 times lower than the world average (Mongolian Academy of Sciences 2019).

Most STI organizations are located in (90 percent) capital city of Ulaanbaatar. The young researchers are studying at 32 research institutions and universities in our country. There are 171 scholars and researchers are studying 25 foreign countries. It is getting better at preparing young researchers in 2016-2018, MNT 2.4 billion were spent on the training of scientists.

Foreign loans are the main source of assistance. The proportion of academic staff with a degree researcher number is increased almost twice between 1996 to 2000. Since 2016, the rates have also been increasing. The number of employees in the science and technology sector 9576 person in 2010 and increased to 14609 persons in 2018 (National Statistic Database 2019). This is because of the increased requirements for degree programs and the change of many boards of higher education institutions to interdisciplinary. One third of academic staff are in natural sciences, one fifth in social sciences and one fifth in the technical sciences.

Recently, one of the internationally recognized indicators used to evaluate scientific potential is the tendency to increase the number of researchers per million population. There is a sharp decline in the number of university recruiters in science, technology and engineering, which in the near future may lead to a lack of quality professionals, researchers and scientists in the field of technology. The above statistics indicate that the role of science and technology in the development of national economy is still insufficient for the national and regional innovation process in Mongolia. As that continues, the lag in science deepens (Science Technology Foundation 2019)

There is a shortage of details on science and technology and innovation research, joint projects and programs. This is due to the fact that the costs of the sector are not detailed and are not reflected in the statistics. It is necessary to reflect in the statistics that private enterprises and production companies of our country spend a considerable amount on technological innovation.

From the outset, the ability to properly grasp, wisely anticipate, and coexist with the changes that take place during the 4<sup>th</sup> Industrial Revolution, is clearly dependent on how well the Mongolian government can formulate and implement sound policies and programs (Science Technology Foundation 2019). For this, the human resources and technology development of the science and technology field and cooperation with foreign research organizations are also important. Success will be achieved through rapid investment in science and technology.

## Science Technology Policy Implementation in Mongolia

In recent years, important policies have been set to expand and develop knowledge-based economy sectors in Mongolia's development policy and planning. It is important to increase the scientific role of Mongolia in ensuring its sustainable development and security, enhancing its national competitiveness and competitiveness, and to ensure its creative and comprehensive activities (Mongolian Academy of Sciences 2019).

To support the knowledge based innovation activities of the national development strategies. To establish the science system as the basis of research and technology development and improve international collaboration (Paavola 2019). To improve the technology growth and innovation capacity of private enterprises.

The Government of Mongolia has adopted the new policy the Law on Science and Technology (2007-2020) in 2006 (MECSS 2007). Within the this plan, the following statements are to be forced in order for Mongolia to follow through the path which the world is inclining towards in this field (MECSS 2007). Increasing funding sources to support the collaboration and partnership between government private- research organizations.

Next new policy launched on 2019, (MECSS 2019) this policy is implementing as the tool to develop Mongolia's science and technology division. Measures within the policy will be reflected in the annual General Guidelines for Development and will be implemented with financing of the state and local budgets, loans, donations and aid from international organizations. The policy sets goals to fully use intellectual and material resources in the scientific and technological sectors and to ensure creative and complex activities. Objectives are included in the policy to ensure the sustainable development and security, to increase the competitiveness and to boost knowledge-based economic sectors as well. The policy will be realized in two phases: first phase of implement plan have 2017-2020 and second phase implement 2021-2025 (MECSS 2019). In the first phase, works will be done to refine upon the scientific and technological policy, its legal landscape and management. Other measures will be taken to improve the infrastructure, to augment the financing and to construct infrastructure for a scientific park. The second phase focuses on increasing the GDP percentage for scientific and technological spheres, boosting the sectors' capacity and competitiveness and developing it as one of the fundamentals of economic development.

To focus on the improvement of technological capacity of priority industry sectors. Linking national science and technology capacity with the regional and global network. The following

principles were pursued in the development of the policy: encouraging private sectors to participate in the development of science and technology sector and utilizing the results; ensuring information transparency; developing a plan that reflects socio-economic interests and objectives; supporting the transfer and adoption of advanced foreign and domestic technologies; ensuring the transparency and accuracy of performance indicators of investments (Duger 2019).

As the state has adopted a science and technology policy, it will economically and socially advance the science and technology sector to a new stage of development, competitively meeting the market demands, in line with economic and social demand and development orders. There is a legal opportunity to update some of the applicable legal documents in line with the policy. As a result, a science park will be established and the share of high technology and innovation products in the GDP will increase (Mongolian Academy of Sciences 2019).

It will also accelerate the process of wealth creation through the economic circulation of intellectual property and develop it into a comprehensive research-training-production system, increasing the competitiveness of the country, improving the standard of living of the population, ensuring sustainable economic and social development, and national security.

## Conclusion

For Mongolia, the contribution of science and technology to the development of the national economy is still insufficient for global and regional scientific relations and regional innovation processes. Therefore, the Mongolian Government is vital to work towards the part of the development of science and technology and innovation to enhance the sector's foreign relations.

There is not enough data compiled in accordance with international standards and methodologies for policymakers, decision makers, researchers, and the general public statistics, information, monitoring and evaluation system, which covers the whole of science, technology and innovation sector of Mongolia. Therefore, it is necessary to address the above issues and develop cooperation in the field of

science in your country and exchange experience.

Although agreements have been reached with research institutions in some countries for science and technology, so far the ongoing research has been slow and uncertain. A realistic look at the current situation and difficulties is increasingly demanding the right policy and the right model of development. Therefore, science and technology policy in Mongolia should be geared to fill the gap above mentioned the challenges in this science, technology and innovation sector. Over the past 30 years, there has been no significant change or improvement in investment or technology in the science. Although any government promises to "support science" and "implement science-based policies", it has been adopted today in the form of "support for funding."

## References

- ADB. 2017. "Technical Assistance Report, "Mongolia: Strengthening Systems for Promoting Science, Technology, and Innovation". Asian Development Bank
- Dolan, B.M. 2012 "Science and Technology Agreements as Tools for Science Diplomacy: A U.S. Case Study," *Science & Diplomacy*, Vol. 1, No. 4. Retrieved on January 7, 2020 from <http://www.sciencediplomacy.org/article/2012/science-and-technology-agreements-tools-for-science-diplomacy>.
- Enkhtuvshin, B. 2016. "National Innovation System of Mongolia," Ulaanbaatar, Mongolia retrieved on January 8, 2020 from [http://www.icsti.su/uploaded/200906/praha2009/mong\\_rpt.pdf](http://www.icsti.su/uploaded/200906/praha2009/mong_rpt.pdf)
- Legal act. 2017. Science Technology Policy: 2017. Retrieved on January 8, 2020 from <https://www.legalinfo.mn/annex/details/8088?lawid=12946>
- Paavola. M. 2019, "Science, technology, and innovation as the engine for growth in Mongolia" Asia Development Bank-funded project aims to strengthen STI systems with new roadmap and investment plan, Ulaanbaatar, Mongolia <https://www.niras.com/development-consulting/news/science-technology-and-innovation-in-mongolia/>
- MECSS. 2007. *Science And Technology Master Plan Of Mongolia 2007-2020*. Ministry of Education, Culture, Science and Sports, retrieved on January 9, 2020 from <https://www.legalinfo.mn/annex/details/2222?lawid=5604>
- MECSS. 2019, Ministry of Education, Culture, Science and Sports (MECSS). Government of Mongolia retrieved on January 10, 2020 from <https://mecss.gov.mn/news/1994/>
- Mongolian Academy of Sciences 2019. Retrieved on January 7, 2020, from <http://mas.ac.mn/?id=196794>

- NSOM. 2018, "Statistical Year Book 2018", Ulaanbaatar, Mongolia
- Duger, R. 2019, "Speech of President of Mongolian Academy of Sciences, Education and Science". Retrieved on January 9, 2020, from [https://montsame.mn/mn/read/180257?fbclid=IwAR3ponbuQmGl8uc4CSVGaeGS\\_0Fluk2SF2cW-FmbUhzOHoyu1Xg\\_IavKDac](https://montsame.mn/mn/read/180257?fbclid=IwAR3ponbuQmGl8uc4CSVGaeGS_0Fluk2SF2cW-FmbUhzOHoyu1Xg_IavKDac)
- Science Technology Foundation. 2019. "Science 2019". Retrieved on January 7, 2020, from <http://fliphtml5.com/ddfdf/jpso>
- National Statistic Database 2019, National Statistic Office of Mongolia. Retrieved on January 7, 2020, from [https://www.1212.mn/tables.aspx?tbl\\_id=DT\\_NSO\\_0400\\_035V2&AGE\\_GROUP5\\_select\\_all=0&AGE\\_GROUP5SingleSelect= 1&ISIC4\\_select\\_all=0&ISIC4SingleSelect= 113&SOUM\\_select\\_all=0&SOUMSingleSelect= 0&YearY\\_select\\_all=0&YearYSingleSelect= 2010\\_2005\\_2000\\_2018&viewtype=table](https://www.1212.mn/tables.aspx?tbl_id=DT_NSO_0400_035V2&AGE_GROUP5_select_all=0&AGE_GROUP5SingleSelect= 1&ISIC4_select_all=0&ISIC4SingleSelect= 113&SOUM_select_all=0&SOUMSingleSelect= 0&YearY_select_all=0&YearYSingleSelect= 2010_2005_2000_2018&viewtype=table)