

Prospects of Mongolia in the Hi-Tech Era: Economic Impact of Innovative Development

Ekaterina P. Rusakova, Nikita S. Kovalev, Aleksey A. Galustyan, Dmitry D. Startsev
Peoples' Friendship University of Russia RUDN University
Moscow, Russia

Ilseiar N. Gubaidullina
The Ufa Law Institute of the Ministry of Internal Affairs of
Russian Federation
Ufa, Russia

Abstract—Innovations are the main drivers of growth in the modern world. The development of new technologies allows the economies of the countries, by introducing them to benefit from higher revenues and provide better living standards for their citizens. At the current stage of development Mongolia is in desperate need of the new technologies in its economy, especially because these innovations can allow its economy to develop faster and steadier. In this article the authors discuss the main directions of innovative development of the country and the possible ways of their implication in the economy of the country, revealing the key issues in this process. The aim of the article is to prove the ineffectiveness of innovations in the Mongolian economy at the current stage and develop the ways of enhancing their productivity in the country's economy.

Keywords—Mongolia; innovations; agriculture; green energy; barriers; prospects

I. INTRODUCTION

Mongolia is one of the most dynamically developing economies in the Asian region (especially in the region of Central Asia). Still, the development of Mongolia is constrained by the agricultural character of the country and the lack of high complication products, such as computer equipment, or high complexity machines, which lie in the basis of the industry development. As for Mongolia, the fundamental development of the industrial sphere is the main task in order to preserve economic independence from the regional leaders and its only neighbors – Russia and China. The innovative development of economy generally contributes to the higher rates of economic and technological development, so in order to follow the global trend in the development of innovative technologies Mongolia has to introduce the innovative products in its economy [1].

Innovative technologies include a vast variety of instruments and products, the main groups of which are the products, connected with the computing technologies, the technologies of Industry 4.0, the innovations in services and social life of a country.

The choice of the most effective instruments and sphere of innovative development of Mongolia depends on the paths and opportunities for the Mongolian economy, which are defined to a high extent by the climate of the country and its social development level. The prospects of the development of the Hi-Tech products in any country depends on international

cooperation in this sphere, especially for the developing economies with a low level of the high technologies' development at the beginning of their innovational development (Mongolia is just such a case).

II. METHODOLOGY

The authors have revealed the main spheres of high potential for innovative development in Mongolia; these are the agricultural sector, the green energy sector and the sector of technological innovations' transfer. In order to do that, the authors have outlined the main comparative advantages of the Mongolian economy and the synergetic effects that innovations may provide for the Mongolian economy.

In order to assess the effects of every sector development, the authors have conducted a comparative and correlational analysis of industries' shares in the GDP and revealed that the researched industries, especially the innovative ones at the current stage do not contribute to the GDP growth more than 1%.

In order to find the solutions to this problem, the authors have conducted the statistical analysis of the indicators in all the mentioned sectors and provided correlational analysis for the agricultural sector between the GDP and the herd growth, and the statistical analysis of the green energy production in the country. The results of the conducted research allow the authors to develop the recommendations for the better development of the sphere in the Mongolian economy.

III. THE ECONOMIC CONJUNCTURE FOR INNOVATIONS IN MONGOLIA

The key factors contributing to the synergetic effect of innovations on the development of Mongolian economy are the following:

- 1) Low base development level – it contributes to the fast growth due to the low base effect. In addition to that, there are no formed barriers for the industry development, neither institutional, nor legal [2].
- 2) Low natural potential for agriculture, while one of the main sources of revenues for the national economy is agricultural exports. It forces the economy to develop better mechanisms of production stimulation [3].

- 3) High contribution of innovations to the GDP growth due to the high demand and high prices of the majority of innovative products and higher effectiveness of the innovative industries (counted per a resource unit).
- 4) The high innovation potential of the main trade partners – China and Russia.
- 5) The necessity to diversify the country’s exports through its main trade partners (the two mentioned superpowers) in order to preserve the economic sovereignty of the country and to find a niche on the developing integrating Asian markets.
- 6) The necessity to establish new mechanisms of international cooperation in Asia.

These major effects lead to the vital importance of the innovational development for Mongolia. The major comparative advantages of Mongolia in the sphere of innovations are the following:

- Low price of energy resources.
- High quantity of natural resources.
- High interest in cooperation with Mongolia from Japan, China and Russia – the leading economies in the innovational development (in specific spheres).

These advantages allow to reveal the key spheres of innovational development of the Mongolian economy, these are: innovations in agricultural sector, implementing new technologies in farming, hi-tech chemistry and biology; green energy development – low population density, good ecology and large territory allows and forces the country to develop the energy sector in the sphere of alternative energy; transfer of technologies – through the cooperation with the foreign countries, especially in the sphere of natural resources development, Mongolia can pursue the Chinese way of the economy development (technologies transfer). Let us give a brief review of the possibilities in every sphere and estimate the potential impact of these possibilities on the Mongolian economy. In order to point out the key trends of the development of these industries, the authors have forecasted their contribution to the GDP (Fig. 1).

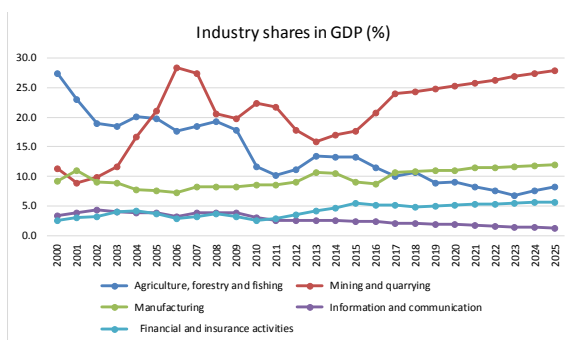


Fig. 1. Industry shares in the GDP (developed by the authors, based on [4]).

Despite the seeming overall growth of the industries’ contribution to the GDP, their impact on the economy boost is doubtful – if the current dynamics is preserved, the gains from innovational development of the Mongolian economy will not exceed 1% GDP (Table 1).

TABLE I. THE CONTRIBUTION OF THE INDUSTRIES SYNERGETIC DEVELOPMENT TO THE GDP (DEVELOPED BY THE AUTHORS)

	2019	2020	2021	2022	2023	2024	2025
Multiplicator	0.96	1.00	0.99	0.98	0.98	1.02	1.01
GDP Share (%)	51.64	52.44	52.61	52.38	52.33	53.78	55.05
GDP delta (%)	-1.91	0.14	-0.72	-1.18	-1.20	0.93	0.47

Table 1 demonstrates the weak potential of innovative development in Mongolia in its current situation, so in order to give recommendations on the further development of the Mongolian economy the research of the opportunities and barriers in the key innovative sectors – mining, production and agriculture – is needed.

A. Innovations in farming

The key technological solutions in the sphere of agriculture appear in the sphere of food security and are aimed at higher efficiency of the crops and higher output of food from the natural resources, gathered in agriculture.

In Mongolia the food industry is rather weak, technologically it is based on the heritage of the USSR, so the majority of consumer goods in this sphere are not technologically advanced. In addition to that, agriculture in Mongolia leaves significant space for traditional farming development, which in case of Mongolia, is herd breeding, so the country highly depends on the surpluses or losses in the quantity of farm animals [5].

As a result, the efficiency of innovations in the agricultural sector highly depends on the efficiency of domestic animals breeding sector, which, in turn, influenced GDP greatly (Fig. 2).

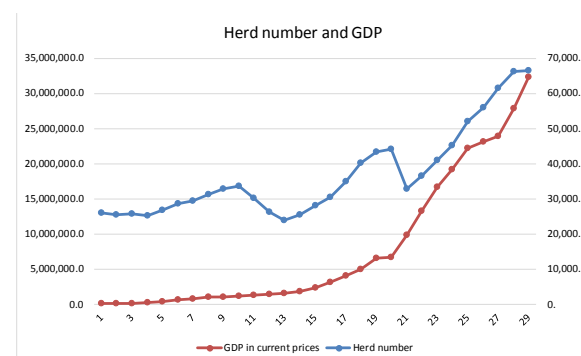


Fig. 2. Herd number and GDP (developed by the authors, based on [6]).

The correlation between the dynamics of the two factors is 0.93 (counted by the authors), which proved their tight interconnection. As a result, the main institutional issues for the innovative development of the agriculture sector are the following:

- traditional structure of agricultural sector;
- higher efficiency of herd breeding than farming;
- lack of financial inflows in farming due to higher returns in herd breeding;
- lack of potential for the development of herd breeding because of the natural limits.

These factors contribute to the high volatility of financial indicators of the investments in innovations in agriculture and depreciate the development of sector from the point of view of the government of Mongolia.

B. Innovations in green energy

Mongolia has a significant territory and low population density, a part of its population still live a nomad life, meaning that the development of ajmak energy grids, tightly linked with each other, is inefficient. The change in the demand, caused by seasonal migration of the population, will ruin the efficiency of such kind of grids. In addition, Mongolia is a country with a good ecological situation, and boosting the development of industry in the country through the extensive development of energy sector, based on conventional energy sources, may cause severe damage to the ecology of the country, producing negative external effects, higher than positive economic influence.

In this regard, green energy is a good solution for Mongolia. In addition to that, several Asian countries (Japan and China, for instance, are capable and ready to provide required support for the development of this sector in Mongolia). Today the development of industry is quite rapid (Fig. 3), however, the general trend remains the same – the consumption of traditional energy resources (Fig. 4).

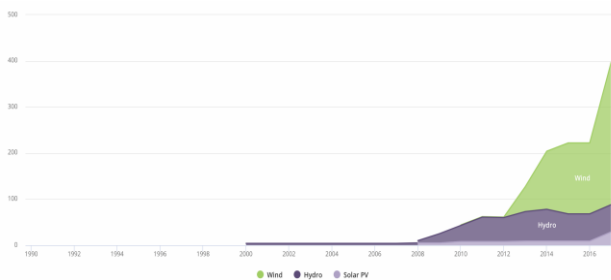


Fig. 3. Alternative energy production [7].

Fig. 3 clearly demonstrates the boom of alternative energy generation after 2012, when Mongolia got access to the cheaper technologies and credits from the development banks, for instance, Asian Development Bank, on the development of the industry.

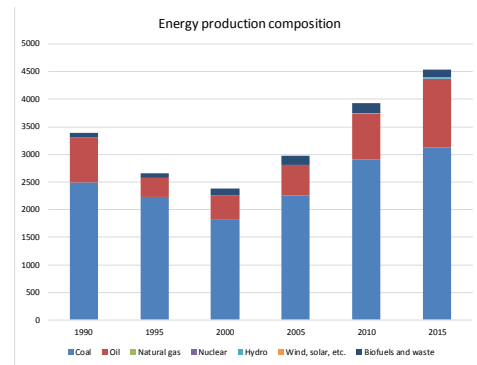


Fig. 4. The energy production composition in ktoe (developed by the authors, based on [7]).

Hence, the major barriers for the development of innovations in this sector for Mongolia are the following:

- lack of financial resources;
- lack of interest from the private sector;
- abundant cheap energy supply from Russia and China.

C. Technology transfer-based innovations

This sector today has the least chances of development in Mongolia. The main problem for it is the lack of reliability for the investors in Mongolia [8]. All transfer-based innovations are possible only in one case – the stable cooperation between foreign and domestic corporations, which today is not happening in Mongolia. The projects on the development of data centers in the country (which, as it seems, may have significantly contributed to the growth of the Mongolian budget and role in technological cooperation in Asia), the transfer of technologies in the mining sphere are either declined by the investors, or are conducted with significant legal issues and are not transparent. Hence, the major issues in this sphere are:

- non-transparent institutions of corporate partnership;
- unreliable partners from the Mongolian side;
- high risks of opportunist behavior and high expectancies form the realization of the projects from the Mongolian partners.

IV. DISCUSSION

All the named issues lead to the significant ineffectiveness of innovations in Mongolia, proved in Table 1. There is no single strategy for overcoming these issues, especially taking into account the national specifics of Mongolia and the fact that the society of the country is conservative and still bears some characteristics of a traditional one. The provided measures may help raise the efficiency of the innovative development of the Mongolian economy, but they are to be implied in complex.

- 1) The proliferation of the technological solutions for private sector in the sphere of solar and wind energy. The majority of the population in Mongolia has gers and uses them for vacations in warm period, so the push for ecological energy and energy access for rural regions in general, based on the green energy

technologies, contributes greatly to the green energy development, higher social development and a better level of living in the country. This contributes to the availability of energy-consuming technologies introduction to the agriculture sphere.

- 2) The proliferation of the reliable partners schemes, which will allow to reveal and put unreliable partners in the country under sanctions. This scheme is to be developed in cooperation with other countries and institutions, for instance, with the Shanghai Cooperation organization.
- 3) The proliferation of high-technologies among the younger generation of the population, aiming especially at those youngsters living in rural regions. This will allow to build ground for further proliferation of innovative agriculture.
- 4) The increase in cooperation with Japan and China in the sphere of green energy, which will allow the country to begin the shift to the better industrial development on innovative tracks in the sphere of green technologies development and transfer of technologies in this sector [9].
- 5) The push for the innovative products, which allow the country to develop fast, but at the same time, which allow Mongolia to use its comparative advantages, such as low terrorism risks, high temperature delta between the seasons and time of day, high solar and wind activity, low population density and its position between China and Russia. These technologies may include the creation of the already mentioned data centers, the creation of the energy generating facilities for the cryptocurrency mining centers in China, the creation of the innovative scientific hub on their territory of the country in partnership with its neighbors, etc. [10].

The mentioned steps are of great importance for the country and are to help the innovative development of it, but first of all, the main task for any reforms in Mongolia is to overcome the institute of opportunist behavior (several of the mentioned steps are aimed at it) and to start the process of creating a more transparent economy and establishing reliable institutions, both social and corporate.

V. CONCLUSION

The economy of Mongolia does not have many benefits from the innovative development at the current stage. The key reason for it is the ineffectiveness of institutional mechanisms in the country.

The general vision of the future of the Mongolian economy and the role of innovative technologies in it is the following. Mongolia suffers from the Dutch illness, caused by the extensive use of its natural resources and low production of high value-added products. The future development of the mining industry and the industrial development of the country in general lead to the worse ecological situation and dependence on foreign companies. The economic authorities of the country do not conduct a policy that is effective enough to cut down the risks and promote sustainable development of the economy, especially of the innovative economy, which was proved during the analysis of the most competitive sectors

(potentially) of the Mongolian economy. The lack of drivers leads the economy of the country in the period of stagnation and volatility, caused by the dependence on the volatility in herd numbers and natural conditions.

The new technologies will contribute to the solution of this problem, but in order to implement them Mongolia needs to overcome opportunist behavior and unreliability of partners. The future of high technologies in the country lies majorly in the sphere of agriculture, green energy and transition and collection of data, while the innovations in mining industry will contribute to the higher dependence of the country on foreign multinational companies and natural resources exports, leading to the impossibility of introducing innovative technologies in other spheres of the economy of the country.

REFERENCES

- [1] E. Litsareva, "Success Factors of Asia-Pacific Fast-Developing Regions' Technological Innovation Development and Economic Growth," *International Journal of Innovation Studies*, 1 (1), pp. 72–88, 2017.
- [2] C. Constantine, "Economic structures, institutions and economic performance," *Economic Structures*, 6, 2, 2017.
- [3] P. Dasgupta, "Nature's role in sustaining economic development," *Philosophical transactions of the Royal Society of London. Series B, Biological sciences*, 365 (1537), pp. 5–11, 2010.
- [4] National Statistics Office of Mongolia, "Industrial Composition of Gross Domestic Product, by divisions," 2019. Retrieved from: http://1212.mn/tables.aspx?tbl_id=DT_NS0_0500_002V1&ISIC_I_select_all=0&ISIC_ISingleSelect=_0_1_2_3_11_10&YearY_select_all=1&YearYSingleSelect=&viewtype=table
- [5] J. Lai, "Innovative Supply Chain Finance," 2014. Retrieved from: <https://www.mongolbank.mn/conferenceeng/presentations.html>
- [6] National Statistics Office of Mongolia, "Gross Domestic Product, by production approach, by divisions," 2019. Retrieved from: http://1212.mn/tables.aspx?tbl_id=DT_NS0_0500_001V1&13999001_select_all=0&13999001SingleSelect=_T1&ISIC_I_select_all=0&ISIC_ISingleSelect=&YearY_select_all=1&YearYSingleSelect=&viewtype=table
- [7] The IEA, "Statistics," 2019. Retrieved from: <https://www.iea.org/statistics/?country=MNG&isISO=true>
- [8] D. Enkh-Otgon, and Z. Baigalmaa, "Technology transfer: Challenges in Mongolia," 2009. Retrieved from: https://www.wipo.int/edocs/mdocs/aspac/en/wipo_ip_cm_09/wipo_ip_cm_09_topic12_mongolia.pdf
- [9] A. Frangoul, "Millions in funding announced for renewable energy project in Mongolia," 2018. Retrieved from: <https://www.cnbc.com/2018/11/02/millions-in-funding-announced-for-renewable-energy-in-mongolia.html>
- [10] McKinsey, "Digital innovation in Asia: What the world can learn," 2016. Retrieved from: <https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/digital-innovation-in-asia-what-the-world-can-learn>