

Working paper 6

Industrial Development of Kyrgyzstan: Plausible Futures

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WP-18-016

[October 2018]

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Acknowledgments

This report is the product of joint efforts of the Research and Industrial Policy Advice (RPA) Division of the United Nations Industrial Development Organization (UNIDO), the International Institute for Applied Systems Analysis (IIASA) and the State Committee for Industry, Energy and Subsoil Use of the Kyrgyz Republic. It has been developed within the context of the project "Strategy of industrial development of Kyrgyzstan", funded by the Russian Federation.

More specifically, under the overall supervision of Mr. Michele Clara, Senior Coordinator, RPA-UNIDO, the team that compiled the report consisted of experts from diverse organizations as follows:

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- Mr. Nurshat Karabashov, Mr. Nurlan Atakanov, Mr. Uran Chekirbaev and Mr. Zhalyyn Zheenaliev (senior experts from Kyrgyzstan).

Special acknowledgment is to Mr. Alymbek Orozbekov and his team at the State Committee for Industry, Energy and Subsoil Use for their continued support during project implementation. Mr. Marat Usupov and his team, UNIDO representative to Kyrgyzstan, facilitated in-country operations and contacts to Kyrgyz stakeholders. Appreciation for inspiring discussions also goes to UNIDO colleagues Mr. Victor Zagrekov, Ms. Olga Memedovic, Mr. Rana Singh, Mr. Nobuya Haraguchi, Mr. Anatoly Balovnev and others.

Significant inputs for the production of this report were received from members of a Critical Stakeholders Group integrated by senior representatives from Kyrgyz government and Kyrgyz private sector organizations and participants at round tables held in Bishkek, Osh, Karakol and Jalal-Abad. The report also benefitted from the feedback of the Steering Committee members, which have been coordinating the implementation of this project. Special thanks is to Kyrgyz experts who were generous with their time and expertise during the interviews Ms. Begaim Esenkulova, Mr. Kylychbek Djakypov, Mr. Asylbek Chekirov, Mr. Eldan Usubakunov, Mr. Iskender Sharsheev, Mr. Aibek Kadyrov, Mr. Farhad Pakyrov, Dr. Talaipek Koichumanov, Mr. Ekmat Baibakpaev, Mr. Alaipek Obozov, Ms. Olga Kan and Dr. Roman Mogilevskii.

Finally, the production of this report would not have been possible without the much appreciated financial support of the Russian Federation and the encouragement of Mrs. Vera Khutorskaya, Counsellor, Permanent Mission of the Russian Federation to the International Organizations in Vienna.

Industrial Development of Kyrgyzstan: Plausible Futures

1. Introduction

Growing globalization worldwide increases the interconnectedness of countries embedded in the complex supply and value chains. Countries also become increasingly interdependent through transnational transport corridors, the exchange of information and knowledge, investments, migrant flows, etc. Hence the future of a single country, especially when it is a small and open developing economy like Kyrgyzstan, is highly contingent on what is going on in its major partners, as well as on the global processes. Indeed, as reflected by the KOF Globalization index (Gygli, Haelg, & Sturm, 2018), Kyrgyzstan achieved the world's level of globalization already in 2007, and since then it has followed the world's path (see Figure 1). Kyrgyzstan's geographical location on the way between China, Russia, and Europe, yields a considerable transit potential for both East-West and North-South directions. The vicinity to countries with large populations, such as India and Pakistan with rapidly growing demands offers new export opportunities. The country's reserves of natural resources, notably, gold, makes it an important part of the global commodity trade network, yet putting its economy in a vulnerable position due to the volatility of the global commodity prices (see Figure 2).

These and other factors make several studies (Shaimergenov, Abisheva, & et al., 2017; WEF, 2014) anticipate an increasing geopolitical and economic importance of the Central Asian region in the coming decades. The political and economic activity of Russia and China in the region including the expansion of the EAEU and the creation of the Silk Road Economic Belt initiative involve Kyrgyzstan and will shape its economic and social spheres to a large extent. These and other factors make several studies (Shaimergenov et al., 2017; WEF, 2014) anticipate an increasing geopolitical and economic importance of the Central Asian region in the coming decades. The political and economic activity of Russia and China in the region including the expansion of the EAEU and the creation of the One Belt – One Road initiative involve Kyrgyzstan and will shape its economic and social spheres to a large extent.

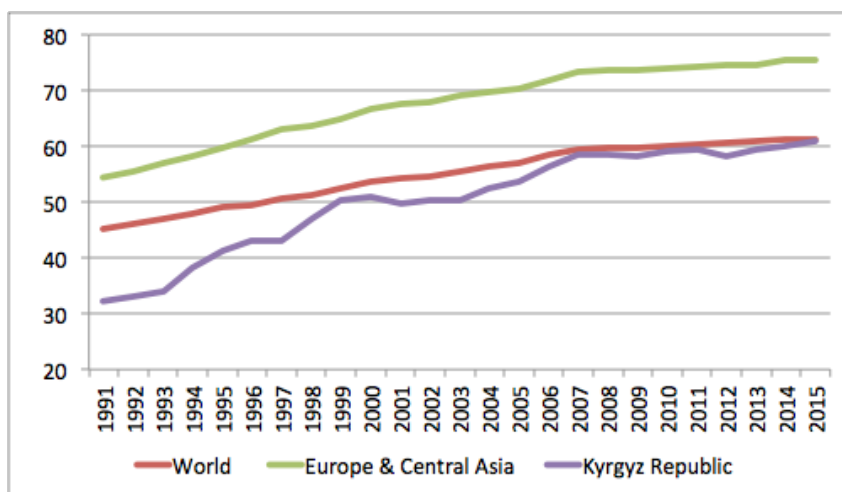


Figure 1. KOF Globalization Index. Source: (Gygli et al., 2018).

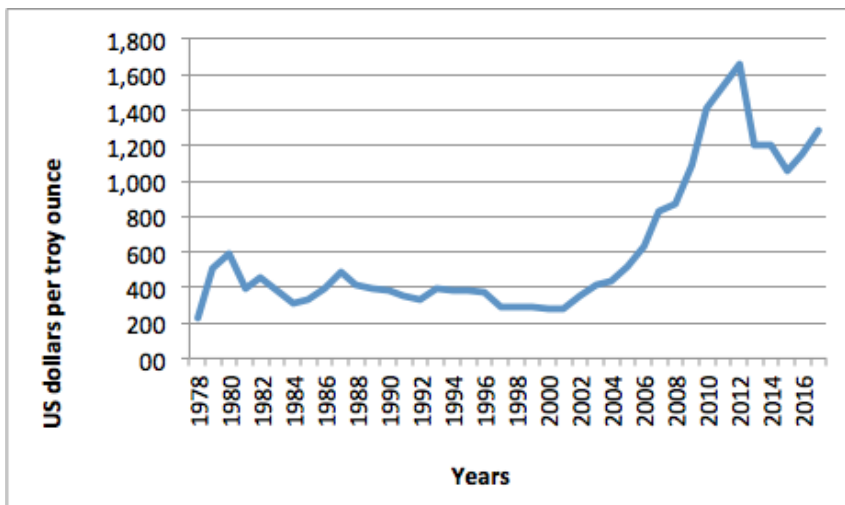


Figure 2. Price of gold (in current prices, US dollars per troy ounce). Source: (World Gold Council, 2018).

Internal economic and social landscape is highly influenced by the political processes, which have been very volatile in the country. Since independence, Kyrgyzstan has experienced two major transformations of the political regime, which are even often referred to as revolutions and as many as 26 cabinets have replaced one another. Weak and inefficient institutions and a high level of informal relations in the governing circles amplify the uncertainty. Dependence on remittances from labor migrants is another highly uncertain, yet important factor defining the economic situation in Kyrgyzstan now (see Figure 1 in Introduction).

Environment and environmental services are becoming a limiting factor of economic development of many developing countries with the Earth approaching its planetary boundaries. First and foremost is climate change expected to significantly affect Kyrgyzstan's water resources, which are crucial for several sectors of the economy, including agriculture and energy. According to estimates accepted by the Intergovernmental Panel on Climate Change (IPCC), annual average temperature increase in Central Asia is expected to be as high as 1.9-5.5 °C by 2050, where the major source of uncertainty is due to alternative general circulation models of climate used in the analysis (Lioubimtseva & Henebry, 2009). Kyrgyzstan should plan its adaptation policy to cope with adverse effects of climate change anticipating a change in the water availability and its predictability, a change in soil quality, and public health effects (Lioubimtseva & Henebry, 2009). Importantly, one has to recognize interdependencies between food production, energy generation, and water availability, often referred to as food-water-energy nexus. With growing demands and production, water becomes a limiting factor to define a feasible extension of the cultivated land and the amount of crops a country can grow vis-a-vis the amount of hydropower energy generated, or coal produced and converted (Gao et al., 2018). Further development of production can only be secured by the deployment of newer more efficient technologies, machinery, fertilizers, and qualified human resources (Gao et al., 2018). If not done timely, it can reduce the competitiveness of domestic agro-products and trigger an increase of unemployment in the rural areas leading to the rural-to-urban migration or the migration of labor abroad, both having adverse consequences for the economic growth. Such interconnections within the food-water-energy nexus are just one example of existential **systemic effects** that **policymakers have to take into consideration when doing strategic planning in face of uncertain futures**.

Moreover, successful planning needs to avoid strategic dead-ends and make sure that **the short- and mid-term actions are compatible with the long-term goals**. For example, extensive coal extraction and its

use to generate energy, in particular, promoted by China, may initially be an economically justified solution to improve the energy security of the country, which is badly needed to support the manufacturing development. However, in the longer run, investments that will have been made into the coal-firing capacities will lock Kyrgyzstan into this most carbon-intensive and air-polluting activity preventing from transiting to more modern, efficient and clean energies.

Scenario planning approach has been proven as a very useful approach for strategic planning in both private and public sectors in case of highly uncertain decision-making environment and multiple (often, opposite) possible futures. It sketches a set of plausible directions in which the current situation can develop in mid- and long-term future enabling stakeholders to adjust the current strategies and develop new policies to be prepared for a range of shocks and create a robust policy portfolio.

The World Economic Forum experts on scenario planning (WEF, 2014) list the following benefits from using scenarios in the strategic planning process:

- It improves a policy's or strategy's robustness by identifying and challenging the underlying assumptions and established wisdom
- It makes better strategic decisions by discovering and framing uncertainties, leading to a more informed understanding of the challenges involved in making substantial and irreversible commitments, and contributing to a strong and pre-emptive governmental or organizational positioning
- It improves the awareness of change by shedding light on the complex interplay of underlying drivers and critical uncertainties and enhancing the sensitivity to weak and early signals of upcoming significant changes
- It increases the preparedness and agility in coping with the unexpected by equipping them to visualize possible futures and to rehearse responses mentally
- It fosters a mutual understanding and collaborative action by providing different stakeholders with a common language and concepts in a non-threatening context, thereby opening the space to create robust, effective and innovative multi-stakeholder strategic options.

In particular, scenario planning was applied in foresight studies focusing on the Central Asian region by several other studies (Shaimergenov et al., 2017; WEF, 2014).

In this report, the scenario planning has been used to construct six plausible scenarios of the economic and industrial development of Kyrgyzstan. The methodology was adopted from (Krys, Schwenker, & Wulf, 2013).

2. Major Uncertainties and Trends

Based on experts' surveys, normative documents and selected studies, IIASA experts identified a total of 75 PESTEL (Political, Economic, Societal, Technological, Environmental and Legal) development factors according to the PESTEL analysis approach (Oxford College of Marketing, 2018). Then, experts were asked to rank these factors in terms of their importance for the industrial development of Kyrgyzstan as well as they were asked to estimate the uncertainty of their manifestation until both 2023 and 2040. Based on the analysis of these data, some of the factors were discarded as not important (see details in Annex 2) and the rest were clustered into 15 groups (clustering implied both the causal relations and complementarities) as follows:

- Cooperation with the Central Asian countries

- Development of cooperation with Central Asia countries including the CAREC program, transport corridors, energy infrastructure, water resources management
- Dependence on the external financial support
 - Dependence of the economy on global commodity prices
 - Deficit and rational use of own and borrowed financial resources, deficit and transparency of the budget, budget discipline, debt burden, coherence of monetary and fiscal policy
 - Reliance on remittances from abroad
 - Dependence on external sources of financial resources
 - Dependence on imports, dependence on re-export of Chinese goods in the CIS
 - Development of the banking and insurance sectors, availability of loans for business and individuals
- Domestic demand
 - Population welfare level (solvency, middle class development, social protection of vulnerable population groups, the pension system, crisis cities)
 - Demographic situation and migration
 - Cross-border crime, extremism, and terrorism
- Integration with the EAEU
 - The EAEU membership and formation of common markets; EAEU cooperation with other countries and associations
 - Harmonization of customs procedures, technical regulation, and standardization, as well as veterinary, phytosanitary and epidemiological control within the EAEU; quality of EAEU standards
- Educational attainment and quality
- Emergent technologies' proliferation
 - Global trends: The fourth Industrial Revolution, nanotechnologies, biotechnologies, composite materials, information technologies, green economy, alternative energy sources, new medicine, etc.
- Quality of domestically produced goods and services
 - Quality of goods and packaging, competitiveness of products
- Labor force supply
 - Employment and occupational safety
 - Adequate distribution of human resources (labor mobility), conformity of skills of workers to the labor market, labor productivity, brain drain
- Quality of institutions and governance
 - Mechanisms of interaction between industrial development subjects (state and regional authorities and self-management, business, civil society, development partners)
 - Integrated approach to the development of regions, cities, and villages
 - Institutional environment for economic development
 - Governance quality
 - Internal political stability
 - Tax system and state social insurance, harmonization of the tax system with the EAEU
 - Degree and quality of state regulation and supervision of business (including the bureaucratization level)
 - Quality and efficiency of the legal framework for investment activities
 - Efficiency and continuity of reforms, predictability of changes in legislation
 - Private property rights guarantee
 - Environmental safety requirements and environmental legislation

- Development of the private-public partnership system
- Governmental support of the domestic manufacturers
- Trade policy and governmental regulation of the economy
 - WTO membership, GSP+ user preferential status
 - Level of economic diversification
 - Development of market mechanisms and business environment
 - Development of services and tourism
 - Access to foreign markets, openness of the EAEU markets
- State of the natural resource base
 - Climate warming and natural climatic conditions; mountainous landscape
 - Water resources availability (including the water quality), melting of glaciers and snowfields
 - Land resources, desertification
- State of the production factors
 - Shortage of electricity, development level of fuel and energy resources
 - Technical and technological level of production, equipment's state, material and technical base, engineering and technical support, energy efficiency
 - Innovations adoption, level of digitalization, promotion of environmentally friendly technologies
 - Technogenic catastrophes and the system of their prevention and mitigation
 - Availability of certification laboratories
 - Transport and logistics infrastructure
 - Accumulation and reproduction of capital
 - Tariff policies, consumer discipline
- State of the rule of law
 - Level of the shadow and informal economy
 - Corruption, distrust of the population and business to the state
 - Legal literacy, social competencies, entrepreneurship culture
 - Public security, access to justice
- Social tension level
- Economic and political situation in major partner countries
 - Proximity to China given its geopolitical position and market size; coupling with the Silk Road Economic Belt
 - Political instability in neighboring countries and geo-political tensions (sanctions against Russia; situation in Ukraine; situation in Syria, Turkey, and the Middle East), trade "wars"
 - Stability of the national currency and inflation
 - Volatility of global commodity prices
 - Economic situation and business activity in the main partner countries (Russia, Kazakhstan, China, etc.)
 - Development of the world economy

Most of these aggregated factors are uncertain by their nature and also depend on other uncertain factors. IIASA experts analyzed their interconnections in a systematic manner and arrived at five aggregated factors (out of 15) being major drivers of the industrial development of the country (Figure 3). This result is validated by the (Shaimergerenov et al., 2017) study, which identifies the most important drivers of the Central Asia development until 2027. For each of the five major drivers IIASA experts identified possible extreme (opposite) values (see Figure 4).

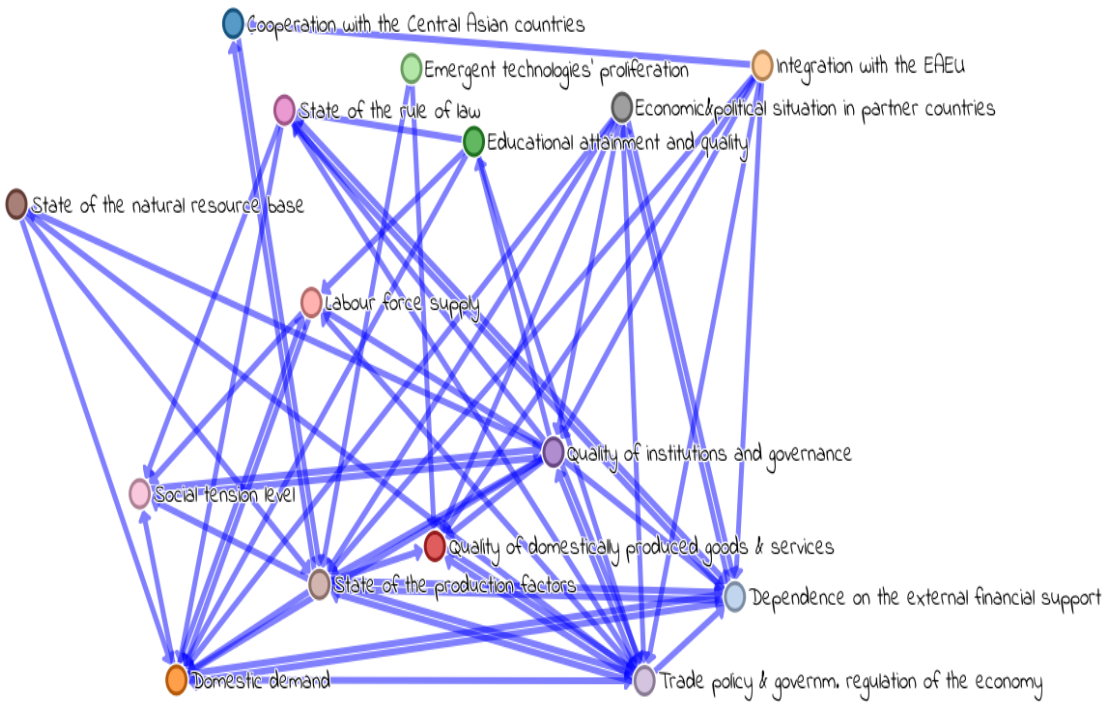


Figure 3. The most influential groups of factors for the industrial development of Kyrgyzstan. An arrow denotes significant impact of at least one of the factors in the source group on at least one of the factors in the destination group.

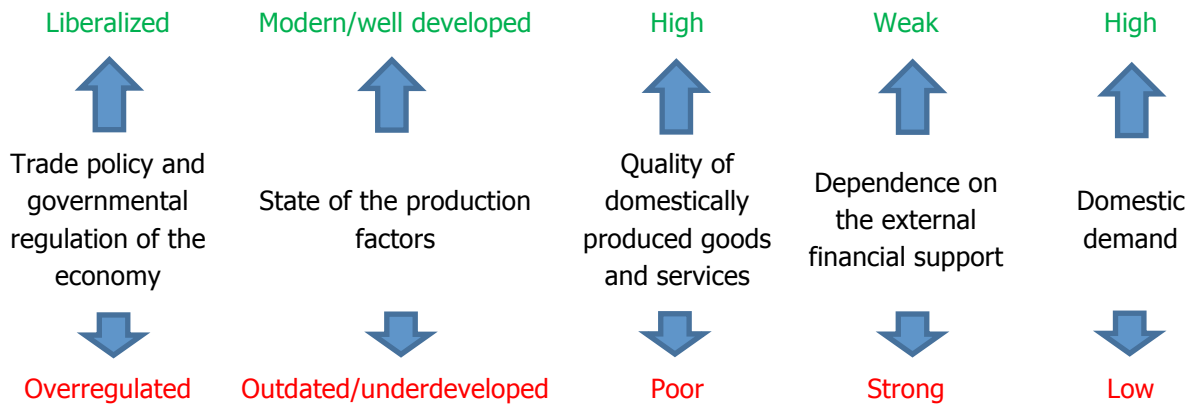


Figure 4. The critical drivers of the industrial development of Kyrgyzstan and their polar values

Six out of 32 possible combinations of the above major drivers' polarities were chosen by IIASA experts as the most plausible over the considered time horizons thus representing the scenario dimensions.

3. Plausible Scenarios

Using the augmented scenario matrix approach and obtained plausible combinations of the critical drivers, IIASA experts produced six possible scenarios of the Kyrgyz industrial development (see Table 1):

- “Modern yurt” (1A)
- “Khagan’s fortress” (1B)
- “Assembly shop” (2)
- “Sand castle” (3)
- “Falling tower” (4A)
- “Abandoned palace” (4B).

The status of the 15 groups of factors in each scenario is depicted in Table 1. Then each scenario is described by a narrative. Each of the scenarios is neither unconditionally negative nor unconditionally positive. Development of each of them depends on both external forces and decisions of the local stakeholders and population. However, scenarios 1A, 1B and 2 imply a high level of the country’s industrial development and scenarios 3, 4A and 4B, on contrary, imply a relatively low level of industrial development.

*Table 1. Important groups of factors shaping the industrial development of Kyrgyzstan and their developments in different scenarios. Groups of factors in **bold** are the identified as major drivers, i.e., the scenario dimensions*

Level of industrialization	High			Low		
Scenarios	1A	1B	2	3	4A	4B
Factors	Modern yurt	Khagan's fortress	Assembly shop	Sand castle	Falling tower	Abandoned palace
Cooperation with the Central Asian countries	actively developing	moderately developing	Stagnating	border tensions	stagnating	stagnating
Dependence on the external financial support	no dependence	weak	strong	strong	strong	strong
Domestic demand	high	high	Low	low	low	low
Integration with the EAEU	active member regulations convergence	EAEU expansion Integration deepening	administrative barriers	administrative barriers	EAEU provides support	EAEU provides support
Educational attainment and quality	increasing	increasing	stays as current	stays as current	stays as current	stays as current
Emergent technologies' proliferation	increasing	slightly increasing	Increasing	increasing	stays as current	stays as current
Quality of domestically produced goods and services	high	high	high	low	low	low
Labor force supply	improving	improving	slightly improving	stays as current	stays as current	stays as current
Quality of institutions and governance	improving	slightly improving	stays as current	stays as current	stays as current	stays as current
Trade policy and governmental regulation of the economy	liberalization	advanced autocracy	overregulation	overregulation	liberalization	overregulation

State of the natural resource base	decreasing importance	decreasing importance; nationalization	good climatic conditions, water, and arable land availability	climate change impact, water shortages	severe climatic change, natural disasters	severe climatic change, natural disasters
State of the production factors	developed	developed	developed	developed	under-developed	under-developed
State of the rule of law	increasing	slightly increasing (corruption risks persist)	slightly increasing	slightly increasing	decreasing	stays as current
Social tension level	low	low	elevated	moderate	elevated	moderate
Economic and political situation in major partner countries	China dominates India and Pakistan develop Geopolitics turns into geo-economics	China develops SREB initiative	Japan and China import technologies and open plants in Kyrgyzstan	Competition for influence in Central Asia China develops SREB initiative	Political instability in neighboring countries	External forces try to exploit Kyrgyz natural resources Geopolitics dominates geo-economics

Scenario 1A. Modern yurt

Kyrgyzstan enjoys rapid economic growth and a massive liberalization of the economy and trade. The quality of domestically produced goods and services ensures their competitiveness on regional and global markets; Kyrgyz industry has embedded into international supply and value chains facilitated by the trade and transport infrastructure that has been built. Production is export-oriented with multiplier effects serving the country to improve other sectors' performance, as well as the welfare of the population, which has eventually stimulated the domestic demand. Kyrgyzstan has overcome the dependence on the external financial support and has become a high-income country.

The country has experienced a transformative change of the political elite. A new generation of reformers and technocrats educated in the framework of New Keynesian Economics has come into power.

It resonates with the major global trend, in which geopolitics turns into geo-economics worldwide. A complexity of various forms of economic integration and cooperation between countries co-exists primarily driven by the economic conjuncture. Kyrgyzstan is an active member of the EAEU, as well as of a number of other arrangements of various levels of commitments ensuring win-win cooperation opportunities.

The EAEU membership has triggered an export growth first to its member countries, and then also to third countries thanks to the enhanced trade cooperation between the EAEU and a number of its key trade partners, including the tariff reduction and the gradual convergence of the EAEU standards and the standards of its major trade partners.

Political, business and intellectual elites cooperate driven by the goal to support the prosperity of the Kyrgyz nation and to integrate the country into the global economy. The rule of law is commonly practiced in Kyrgyzstan, the informal sector of the economy has been substantially reduced, and the corruption level has significantly decreased due to affirmative actions of the government and the change in the mentality of the new generation of stakeholders.

Kyrgyzstan, as a part of the Central Asia region, has become a “Eurasian gate” for China that has achieved a dominating position in the global economic hierarchy and other Asian countries (e.g., India, Pakistan), which have become considerable economic powers. Transport-logistical infrastructure plays a key role; it has been developed with the assistance of partners, notably, China, Russia, and the EU. Therethrough, new supply chains emerge, and the overall overland trade in Eurasia has substantially increased, notably between the EU and major Asian economies. Therefore, the connectivity in the region has been increasing, and Kyrgyzstan is able to benefit from its transit position becoming a major hub supporting the trade flows between Europe and Asia.

Massive investment from the development partners also bringing the transfer of technologies and modern international practices have come into Kyrgyzstan; most of its capital is foreign-owned; transnational corporations have settled their branches here. The technological gap between Kyrgyzstan and developed countries has significantly been reduced. Foreign investments are targeted, *inter alia*, at the development of innovative and green technologies including renewable power sources (i.e., HPSs, solar and wind power). Kyrgyz energy is exported to neighbors and South Asia.

The national economy is significantly diversified, and the traditional reliance on raw materials has gradually declined. The country is strongly embedded into regional and global value and supply chains. Notably, the cooperation with other Central Asia countries is enhanced, in particular, in terms of joint infrastructure projects and in the energy field. As the country produces more goods and services with higher value-added, more jobs have been created, and labor migration has been reduced; remittances is no longer a noticeable source of income for the country. Importantly, the government focuses on the essential role of the human capital and has developed the education system to produce skilled professionals in the fields needed for the economy. The "dual" education system, in which students can acquire practical hands-on skills while studying has been introduced. It delivers professionals satisfying the increased demand in skilled labor in major economic sectors.

Economic growth, in turn, supports the political stability of the country, improves the welfare of the population and aids to reduce poverty. The domestic consumption increases and a broad middle class is starting to emerge. The liberal economic policy stimulates a rapid development of SMEs in the light industry, services, and tourism sector. The political-economic regime can be defined as *liberal region-integrationalism*.

Scenario 1B: Khagan’s fortress

Kyrgyzstan enjoys a growth under a strongly centralized power model. The quality of domestically produced goods and services is ensured by the strict governmental control in the spirit of the "advanced autocracy". The Kyrgyz economy has reached a decent level of self-sufficiency; the commodities which are not produced domestically are imported mainly from the EAEU and Central Asian neighbors. Kyrgyzstan has overcome the dependence on the external financial support and has become a high-income country.

The country has continued to follow the model of strong centralized power. The ruling elite appreciates the importance of the industrial development as a basis for economic growth. In its attempts to enhance growth, they refrain from experimenting with the political and economic modernization and prefer to rely on traditional economic development models, in which first the growth is ensured by the natural resource exploitation and then it can proceed to higher value-added activities.

The political stability increases the investment attractiveness of the country, but corruption remains. As major economic agents are mainly from the same region, they are familiar with these practices and can embed into this system well.

Kyrgyzstan follows a pragmatic approach engaging into regional cooperation arrangements as it sees fit to its strategic goals. These include the CIS, SCO, as well as China's SREB initiative. The membership in the EAEU plays a crucial role; the EAEU itself has expanded and includes now other Central Asian countries (Uzbekistan, Tajikistan) and other Asian countries (e.g., Vietnam). The EAEU has also deepened its integration level and essentially has become "Eurasian Union" mimicking the EU model; it also adopted a common currency "Eurasion".

The Kyrgyz economy has reached a decent level of self-sufficiency; the commodities which are not produced domestically are imported mainly from the EAEU and Central Asian neighbors.

The role of the state in the national economy is essential. The Kumtor gold mine has been nationalized, which substantially increased its contribution to the state budget; besides, the light and food processing industries make a major contribution to the economy supplying their products both to the domestic market and to the EAEU and partners' markets. However, the overregulation of the market and the absence of free competition may lead to unequal growth.

The government conducts a dedicated social policy, in which it re-distributes the state revenues to the society to support the public sector, reduce inequality and eliminate poverty. Such a policy reinforces the formation of the middle-income working class that generates a basis of the domestic demand. This policy also enhances the social cohesion and reduces the incentives for emigration.

Environmental quality is not regarded as a big concern by the Government; the green economy is not a priority. Climate change effects are moderate. Local communities and environmentalist NGOs are consulted, but they do not have a big power.

Scenario 2: Assembly shop

Kyrgyzstan has become an assembly shop/raw materials appendage for richer countries. International investors (mainly Chinese) have been attracted into several sectors, including the gold mining, automobile industry, and food processing. The production base has been modernized, and the quality of domestically produced goods and services is high. Investors came with their workers, technologies, and inputs, so the Kyrgyz economy could not benefit from the multiplier effects. The economy remains overregulated. The inequality among the population is increasing; the overall national welfare remains low. The domestic demand is low, and the dependence on external financial support continues to be existential.

The government is stable; it consistently believes in the importance of a strongly centralized power structure for the country's prosperity.

Kyrgyzstan has not been able to take advantage of the membership in the EAEU as Kyrgyz goods remain discriminated through non-tariff (administrative) barriers.

The ruling elite has been able to attract foreign investors, mainly from China and other Asian countries. Several contacts reactivating idle industrial plants, including those manufacturing machinery and equipment, and creating new ones have been concluded with the assistance of foreign donors.

Rapidly developing South-East Asian countries are seeking for cheap assembly lines and are ready to invest into the manufacturing sector of Kyrgyzstan. New technologies are imported from Japan and South Korea. However, the professional educational programs for the local population are not developed, and Kyrgyz people occupy mostly low-skilled positions. Workers at plants receive low wages. High-skilled labor is imported from abroad. In the gold mining and production, concession agreements have been concluded with foreign investors. Reciprocally, the government was able to negotiate deals with international donors to get cheap and long loans, which it uses mainly for social purposes and to develop the transport and trade infrastructure. Some of the plants are owned by local oligarchs. The state's budget is small and has a significant deficit.

Taxes and various duties are growing as the government attempts to increase the budget's income. However, it leads to lower revenue, as a large share of SMEs stays in the shadow zone.

Through foreign investments, coal mining, coal-based energy generation, oil refinery, and hydropower electricity has boosted. Kyrgyzstan exports energy and electricity to neighbors. These developments aggravated the air pollution in the cities, which negatively affects the public health and causes economic losses.

Relatively good climatic conditions and water availability favor agricultural activities. There exist large agro-holdings and small, mainly family-based, farms. Agro-holdings employ modern foreign irrigation technologies and production lines; they produce selected food products that are exported to the EAEU and other regional markets. As the production is largely automated, they do not need much labor. The rural population is mainly involved in small farms; they employ primitive technologies to grow crops and cultivate livestock that is used to produce food for domestic consumption. Because small producers cannot ensure competitive efficiency, in many cases cheaper products are imported from the EAEU.

The income inequality, low social guarantees and prevalent regulatory and administrative barriers dampen the social mood, and many people choose to emigrate.

Scenario 3: Sand castle

Global superpowers compete for the influence over the Central Asian region as it connects Asia and Europe overland, plays a role in the global security, and has some important natural resources, which are becoming scarce in the face of the ever-growing global population.

Foreign donors heavily invest in the country, but it is not able to take advantage of it. The economy remains overregulated. Production base has been modernized, but in the absence of skilled managers and an overall national development strategy, the quality of domestically produced goods and services remains poor. Oligarchs and high-level politicians personally benefit from foreign aid; inequality is extreme, most of the

population is in poverty. The domestic demand is low, and the dependence on external financial support continues to be existential.

The country has reached the political stability, and the government is able to serve at least one full term of office. External borrowings are existential for this stability; the government negotiates loans from external donors, e.g., Russian-Kyrgyz Development Fund and IMF. The public debt has reached 150% to the annual GDP.

China is interested in improving the transport infrastructure in Kyrgyzstan to use it as a part of its SREB initiative and is ready to invest in it. However, transport corridors do not become development corridors. At the same time, despite common markets, the EAEU countries apply protectionist policies and subsidize their producers; Kazakhstan continues to impose non-tariff barriers for Kyrgyz agricultural products. These limit the possibilities of Kyrgyzstan to take advantage of the EAEU membership. Border tensions with the neighboring Central Asian countries (e.g., over shared water resources) do not allow extending the markets in these directions.

Large investments and foreign aid have allowed to modernize manufacturing and develop energy generation, notably, green energy using hydropower. Kyrgyzstan exports electricity to the EAEU. Corruption and inefficient institutions are barriers for the development of SMEs and improvement of quality standards in manufacturing.

Climate change causes significant water shortages, and even recently imported modern technologies do not allow increasing agricultural production. Energy generation by HPSs is also unstable, and enterprises face electricity shortages.

These developments increase the unemployment. A significant share of the population stays below the poverty level. Due to lack of quality professional education and unattractiveness of domestic workplaces emigration continues. Remittances are an existential source of income for people. Domestic demand remains low, and the export potential of the produced goods is hindered by their insufficient quality and competition on the open EAEU market.

Scenario 4A: Falling tower

Massive liberalization reforms have not delivered a sustainable economic growth; the economy is reliant on the natural resource extraction and is essentially stagnating. The production base has aged, and the quality of domestically produced goods and services is low. The population is poor, the domestic demand and consumption are low. International donors continue to provide substantial financial support, which saves the country from bankruptcy.

The ruling elites have been convinced that liberalization is a key to growth, yet they have not been able to establish an institutional system and conduct other reforms to get involved into the global and regional supply and value chains, and thus benefit from the openness. Governments replace one another every year, the race for power continues and undermines the trust in the state.

Neighboring countries suffer from the political instability, poor governance and the stagnation of the economy as well. Illegal economic operations, crime, and illegal migration are widespread in the region. The shadow and informal economy rate reached as much as 50%. Kyrgyzstan experiences massive brain drain losing its human capital.

Kyrgyzstan suffers from the natural resource curse; the population lives on the rent from the extraction of resources, notably gold, but the state revenues are low.

The Government would like to see SMEs in the service and tourism sector as a viable alternative to the industrial development as these sectors have a higher return on investments. However, the lack of entrepreneurial culture prevents from these developments. Due to the plethora of various risks and uncertainties, few entrepreneurs are ready to commit to long-term investments, e.g., in agricultural or manufacturing sectors.

Infrastructure and production base has aged and has not been modernized. Produced goods are of low quality and do not comply with the international standards; they are mainly sold domestically or in neighboring countries bypassing the customs control. Farmers use primitive technologies to grow crops; extensive agriculture leads to the degradation and soil and water. Petty-commodity and small firm sizes prevent from utilizing the advantages of the economy of scale.

Climate change is severe, increased droughts, floods and heatwaves further deteriorate public and private capital, and make people migrate. People are poor and often protest against the current power. Minimal living standards are maintained due to international aid and remittances.

All the attempts to attract transnational corporations and international investors to the country have failed; the country ranks very low in terms of credit risks and business opportunities.

Scenario 4B: Abandoned palace

A strongly centralized power has not been able to adapt to the modern conditions and trends. Due to a massive global financial crisis, the financial resources in the world has shrunk, and international donors are not willing to invest in a country with an outdated political system. The economy is reliant on the natural resource extraction and is essentially stagnating. The production base has aged, and the quality of domestically produced goods and services is low. The population is poor, the domestic demand and consumption are low. The EAEU provides some support; together with a large flow of remittances, it helps the population from falling into extreme poverty.

The political system has stabilized; the bureaucratic system has bloated, business and other spheres of life are regulated by numerous, often ambivalent rules and laws. The presence of the government in the economy is dominating, it owns or co-owns major resources and enterprises. In the absence of competition and transparency, the quality of governance is poor. Overregulation hampers efficiency and threatens international investors.

Geopolitics dominates geo-economics in the region. External forces, like China, Russia, and the USA use political and societal instability in their interests and try to conclude agreements use of the natural resources,

which are not the in the best interests of Kyrgyzstan. The government is not able to negotiate joint infrastructure projects and beneficial trade agreements with neighboring Central Asian countries.

Kyrgyzstan suffers from the natural resource curse; the population lives on the rent from the extraction of resources, notably gold. All attempts to revive the industry remain declarative and try to use outdated methods. The state revenues are used to maintain the large bureaucratic system leaving little resources to be used to invest in the modernization of the infrastructure and production base. Consequently, they have aged; produced goods are of low quality and do not comply with the international standards; they are mainly sold domestically or to regional markets. The failure to implement necessary transformations through joint efforts of stakeholders on all levels prevents from decreasing the economic fragility of the country and adds to its exposure to external shocks.

Climate change is severe, increased droughts, floods and heatwaves further deteriorate public and private capital, and make people migrate. People are poor; minimal living standards are maintained due to aid from the EAEU and remittances.

Scenarios summary

					
1A Modern yurt	1B Khagan's fortress	2 Assembly shop	3 Sand castle	4A Falling tower	4B Abandoned palace
<p><i>Kyrgyzstan enjoys rapid economic growth and a massive liberalization of the economy and trade. The quality of domestically produced goods and services ensures their competitiveness on regional and global markets; Kyrgyz industry has embedded into global supply and value chains facilitated by the trade and transport infrastructure that has been built. Production is export-oriented with multiplier effects serving the country to improve other sectors' performance, as well as the welfare of the population, which has eventually stimulated the domestic demand. Kyrgyzstan has overcome the dependence on the external financial support and has become a high-income country.</i></p>	<p><i>Kyrgyzstan enjoys a growth under a strongly centralized power model. The quality of domestically produced goods and services is ensured by the strict governmental control in the spirit of the "advanced autocracy". The Kyrgyz economy has reached a decent level of self-sufficiency; the commodities which are not produced domestically are imported mainly from the EAEU and Central Asian neighbors. Kyrgyzstan has overcome the dependence on the external financial support and has become a high-income country.</i></p>	<p><i>Kyrgyzstan has become an assembly shop/raw materials appendage for richer countries. International investors (mainly Chinese) have been attracted into several sectors, including the gold mining, automobile industry, and food processing. The production base has been modernized, and the quality of domestically produced goods and services is high. Investors came with their workers, technologies, and inputs, so the Kyrgyz economy could not benefit from the multiplier effects. The economy remains overregulated. The inequality among the population is increasing; the overall national welfare remains low. The domestic demand is low, and the dependence on external financial support continues to be existential.</i></p>	<p><i>Global superpowers compete for the influence over the Central Asian region as it connects Asia and Europe overland, plays a role in the global security, and has some important natural resources, which are becoming scarce in the face of the ever-growing global population. Foreign donors heavily invest in the country, but it is not able to take advantage of it. The economy remains overregulated. Production base has been modernized, but in the absence of skilled managers and an overall national development strategy, the quality of domestically produced goods and services remains poor. Oligarchs and high-level politicians personally benefit from foreign aid; inequality is extreme, most of the population is in poverty. The domestic demand is low, and the dependence on external financial support continues to be existential.</i></p>	<p><i>Massive liberalization reforms have not delivered a sustainable economic growth; the economy is reliant on the natural resource extraction and is essentially stagnating. The production base has aged, and the quality of domestically produced goods and services is low. The population is poor, the domestic demand and consumption are low. International donors continue to provide substantial financial support, which saves the country from bankruptcy.</i></p>	<p><i>A strongly centralized power has not been able to adapt to the modern conditions and trends. Due to a massive global financial crisis, the financial resources in the world has shrunk, and international donors are not willing to invest in a country with an outdated political system. The economy is reliant on the natural resource extraction and is essentially stagnating. The production base has aged, and the quality of domestically produced goods and services is low. The population is poor, the domestic demand and consumption are low. The EAEU provides some support; together with a large flow of remittances, it helps the population from falling into extreme poverty.</i></p>

4. Key messages

- Presented here scenarios are just some selected future options; they are made extreme for illustration purpose; the real development is likely to combine features of different scenarios
- Scenario narratives serve the goal to highlight key uncertainties and feedback loops; they help to understand the major challenges Kyrgyzstan is going to face in the upcoming decades
- Kyrgyzstan is currently at crossroads; new opportunities and threats will emerge from the external trends, notably, from the geopolitical ambitions of global superpowers
- Whether geopolitics will be replaced by geo-economics will shape the Eurasian trade and investment structure; political and economic relations within the US-EU-Russia-China complex will have immediate implications for Kyrgyzstan
- The situation in the region, including the political regimes in other Central Asian countries, as well as the EAEU development will play an important role in defining trade opportunities
- Globalization vs. Inter-regionalism will determine the complexity of trade and investment opportunities
- Emergent technologies, Internet of Things, 3D printing, cryptocurrencies and so on will define how much of physical goods will be traded across the continent
- Massive automation is yet another challenge; many low and mid-skilled jobs will disappear, and the global labor demand will shift towards high-skilled jobs; the importance of the human capital development will ever increase
- Aging of the population can be expected if the country gets on the rapid development trajectory; the burden onto the social security system will be increasing
- Timely and effective recognition and employment of the opportunities, as well as mitigation of threats, is existential for the successful economic growth
- Effective institutions and modern infrastructure are pre-requisites of the success of the re-industrialization
- New ruling elites will come into power, and their values and beliefs will be key in determining the pathway the country will take; simplifying, the major dichotomy is between extensive liberalization/service orientation and protectionism/reliance on traditional economic sectors
- Sustainable economic growth and re-invigoration of the industrial sector are possible under various external trends and internal arrangements; the task is not to select one single correct development model, but to synchronize the political and economic development paths; resilience and adaptivity of the economy are the important goals
- Development of production most likely requires cooperation with the development partners; the key challenge is to enhance the multiplier effects and not only achieve export-orientation of the economy, but also develop domestic markets
- Remittances are likely to remain an important source of income for families, at least over the transition period; development of the banking system is essential to make transfers cheap and safe; work with Kyrgyz diasporas abroad can help preserve the connection of migrants with home
- Rising connectivity over the Eurasian continent is a major opportunity; cooperation with all regional partners is key for win-win solutions
- Climate change constitutes a major challenge; strategic investments made now need to be robust with respect to the uncertainty it entails; adaptation policy should be designed and implemented including securing appropriate funds

- The global trend towards a low-carbon or even fossil-fuel-free economy creates an opportunity for Kyrgyzstan to develop green energy options, notably, hydropower

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Annex. Scenario planning methodology

Scenario planning is a prime technique of future studies that has long been used by government planners, corporate managers and military analysts as a powerful tool to aid the decision making in the face of deep uncertainty (Leitner et al., 2018). It aims at a systematic exploration of plausible futures, focusing especially on polar cases of uncertain factors.

There are several variations of the scenario planning methodology; in our study we rely on the framework developed by Roland Berger and Leipzig Graduate School of Management (HHL) Center for Strategy and Scenario Planning (Krys et al., 2013) and augmented by our team. The process was split into the preparatory stage and three major stages. At the preparatory stage we assured the definition of the project scope and timeframe using the Framing Checklist tool (Wulf, Brands, & Meissner, 2011b).



Figure 5. The framing checklist of the scenario development task

At the first stage, using the 360° Stakeholder Feedback Tool (Wulf, Brands, & Meißner, 2010) we collected factors, which are considered to be important for the industrial development of Kyrgyzstan. For that purpose,

we run expert surveys; we approached both experts from Kyrgyzstan and international specialists who were asked to name factors according to PESTEL (Political, Economic, Societal, Technological, Environmental, Technological and Legal; (Oxford College of Marketing, 2018)) framework. The survey used is available at <https://goo.gl/forms/fkH4OcYpu2RiQsGi1>. The identical version in Russian was also used.

Then IIASA experts validated and complemented the identified factors by the analysis of the strategic documents developed by governmental authorities of Kyrgyzstan, research papers, media sources etc. As an outcome, a total of approximately 250 factors were named. These factors were then clustered into 75 groups of aggregated factors (see Table 2).

Table 2. 75 PESTEL factors based on expert surveys and review of the strategic documents

Political factors	
P1	Mechanisms of interaction between industrial development subjects (state and regional authorities and self-management, business, civil society, development partners)
P2	Integrated approach to the development of regions, cities and villages
P3	Institutional environment for economic development
P4	Governance quality
P5	Internal political stability
P6	Simplification of the visa regime with partner countries
P7	The EAEU Membership and formation of common markets; EAEU cooperation with other countries and associations
P8	Development of cooperation with Central Asia countries (CAREC program, transport corridors, energy infrastructure, water resources management)
P9	WTO membership, GSP+ user preferential status
P10	Proximity to China in view of its geopolitical position and market size; Coupling with the Silk Road Economic Belt
P11	Cooperation with South and South-East Asian countries
P12	Cooperation with the USA
P13	Political instability in neighboring countries and geo-political tensions (sanctions against Russia; situation in Ukraine; situation in Syria, Turkey and the Middle East), trade "wars"
P14	Participation in other integration blocks (SCO etc.)
P15	Regionalization, globalization, increasing importance of new centers of influence (e.g., BRICS etc.), a rapidly changing world
Technological factors	
T1	Shortage of electricity, development level of fuel and energy resources
T2	Technical and technological level of production, equipment's state, material and technical base, engineering and technical support, energy efficiency
T3	Innovations' adoption, level of digitalization, promotion of environmentally friendly technologies
T4	Quality of goods and packaging, competitiveness of products
T5	Technogenic catastrophes and the system of their prevention and mitigation

T6	Availability of certification laboratories
T7	Transport and logistics infrastructure
T8	Global trends: The fourth Industrial Revolution, nanotechnologies, biotechnologies, composite materials, information technologies, green economy, alternative energy sources, new medicine, etc.
Environmental factors	
E1	Climate warming and natural climatic conditions
E2	Ecosystem state and quality of ecosystem services (land resources, yields etc.)
E3	Air pollution
E4	Natural disasters (droughts, heavy rains, etc.)
E5	Water availability (including water quality), melting of glaciers and snowfields
E6	Land resources, desertification
E7	Greenhouse gas emissions, decisions of the Paris climate conference
E8	Environmental safety requirements and environmental legislation
E9	Waste management (including tailings)
E10	Usage of GMOs
Legal factors	
L1	Tax system and state social insurance, harmonization of the tax system with the EAEU
L2	Degree and quality of state regulation and supervision of business (including the bureaucratization level)
L3	Quality and efficiency of the legal framework for investment activities
L4	Level of the shadow and informal economy
L5	Efficiency and continuity of reforms, predictability of changes in legislation
L6	Private property rights guarantee
L7	Harmonization of customs procedures, technical regulation and standardization, as well as veterinary, phytosanitary and epidemiological control within the EAEU; quality of EAEU standards
Social factors	
S1	Increasing consumers requirements, fashion trends
S2	Social tension
S3	Employment and occupational safety
S4	Population welfare level (solvency, middle class development, social protection of vulnerable population groups, pension system, crisis of cities)
S5	Demographic situation and migration
S6	Adequate distribution of human resources (labor mobility), conformity of skills of workers to labor market, labor productivity, brain drain
S7	Quality of education
S8	Public health
S9	Corruption, distrust of population and business to the state
S10	Legal literacy, social competencies, entrepreneurship culture
S11	Involvement of the society in the political processes, a dialogue between local population and business

S12	Social infrastructure and social cohesion
S13	Public security, access to justice
S14	Cross-border crime, extremism and terrorism
Economic factors	
Ec1	Availability of fossil resources
Ec2	Dependence of the economy on global commodity prices
Ec3	Deficit and rational use of own and borrowed financial resources, deficit and transparency of the budget, budget discipline, debt burden, coherence of monetary and fiscal policy
Ec4	Stability of the national currency and inflation
Ec5	Reliance on remittances from abroad
Ec6	Dependence on external sources of financial resources
Ec7	Dependence on imports, dependence on re-export of Chinese goods in the CIS
Ec8	Level of economic diversification
Ec9	Development of the private-public partnership system
Ec10	Governmental support of the domestic manufacturers
Ec11	Development of banking and insurance sectors, availability of loans for business and individuals
Ec12	Development of market mechanisms and business environment
Ec13	Petty commodity production, agricultural production fragmentation
Ec14	Accumulation and reproduction of capital
Ec15	Tariff policies, consumer discipline
Ec16	Economic diplomacy
Ec17	Development of services and tourism
Ec18	Volatility of global commodity prices
Ec19	Economic situation and business activity in the main partner countries (Russia, Kazakhstan, China, etc.)
Ec20	Access to foreign markets, openness of the EAEU markets
Ec21	Development of the world economy

At the second stage, another survey for the experts was launched. Experts were asked to rate the impact of these factors for the industrial development of Kyrgyzstan (1 – weakest impact; 10 – strongest impact) and the uncertainty of their manifestation until both 2023 and 2040 (1 – very certain; 10 – most uncertain). The obtained results were aggregated using the Impact-Uncertainty Grid tool (Wulf, Brands, & Meissner, 2011a) (Figures 6 and 7).

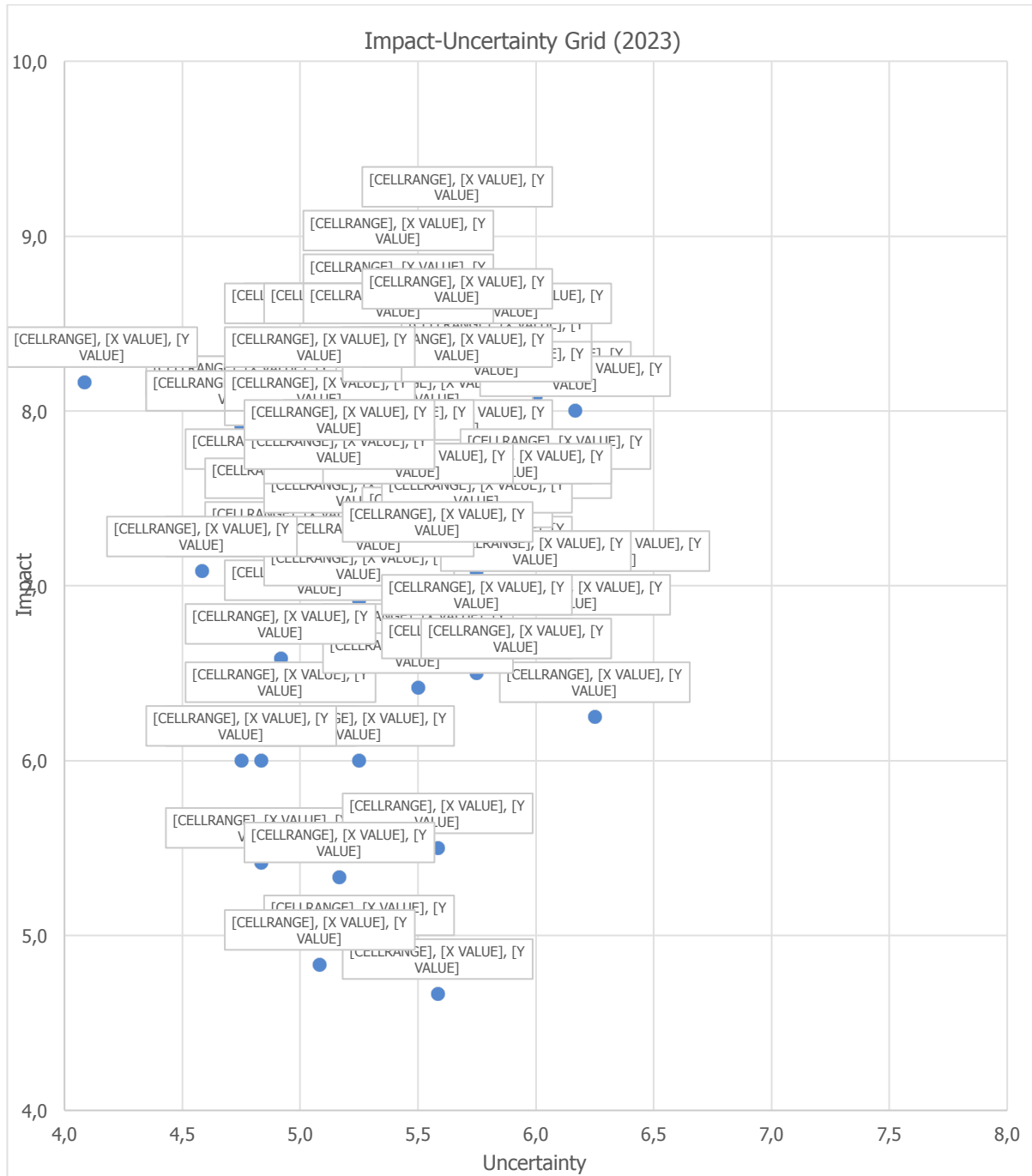


Figure 6. Impact-Uncertainty Grid for 75 factors at the horizon-2023.

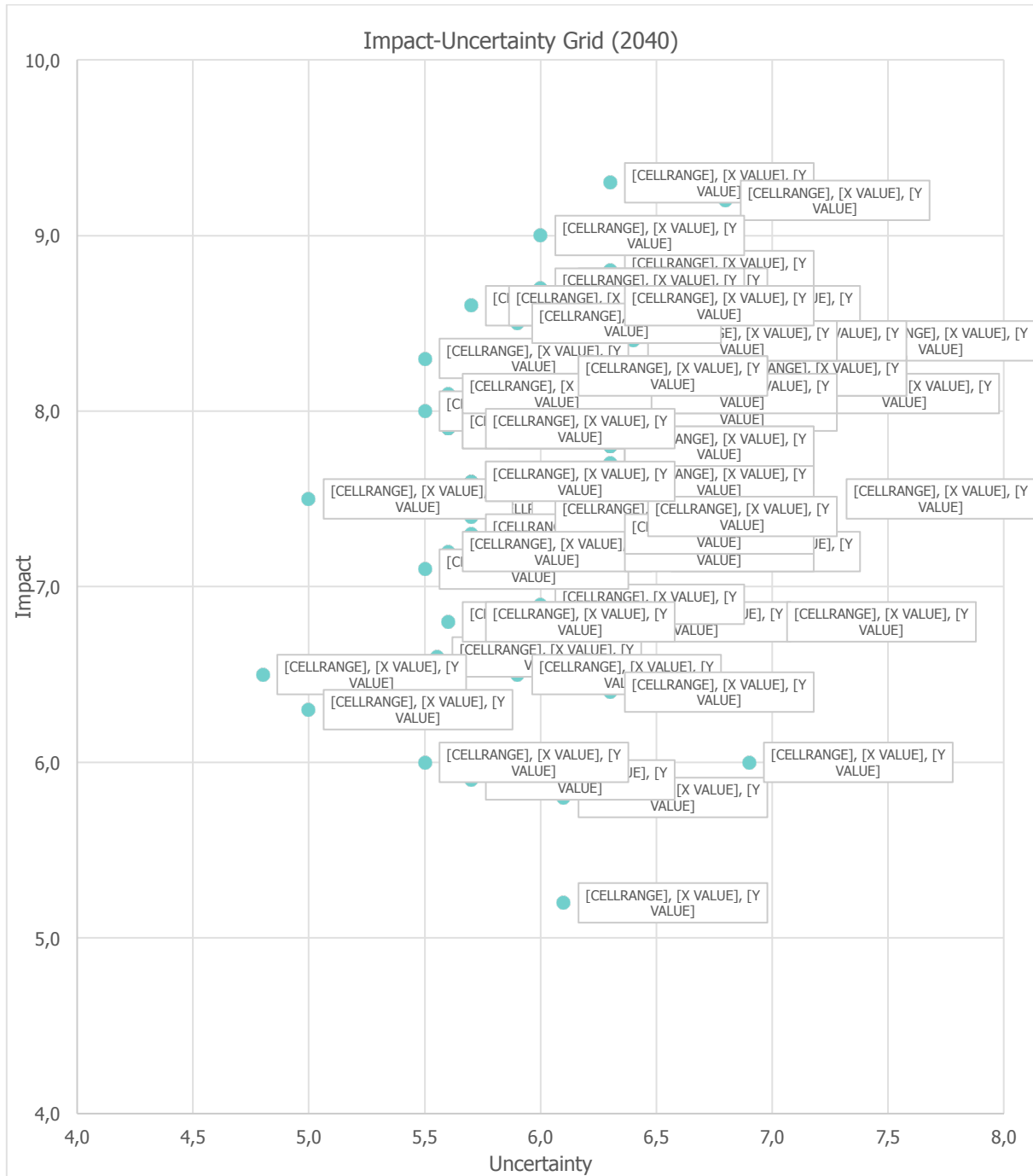


Figure 7. Impact-Uncertainty Grid for 75 factors at the horizon-2040.



Impact-Uncertainty Classification

I n p a c t	High	Critical Planning Issues	Important Scenario Drivers	Critical Scenario Drivers
	Mod	Important Planning Issues	Important Planning Issues	Important Scenario Drivers
	Low	Monitor	Monitor	Monitor & re-assess
		Low	Moderate	High

Uncertainty

Figure 8. An example of factors classification approach (Conway, 2003)

19 factors with the lowest impact regardless of their uncertainty were discarded prior to the further analysis, a method proposed by (Conway, 2003) was used (see Figure 8). However, the distinction between moderate and high impact and uncertainty was not so straightforward as the rankings by the experts were quite close. Subsequently, at the third stage of the analysis, the number of factors was reduced through clustering them into larger groups based on both generalization and causal dependences. For this purpose, a two-step Influence Diagram (Wulf, Brands, & Meissner, 2010) was created. Namely, first, links between the remaining 56 factors were identified. Second, on this basis, there were 15 groups of factors emerged and then feedbacks between them were analyzed (see Figure 9).

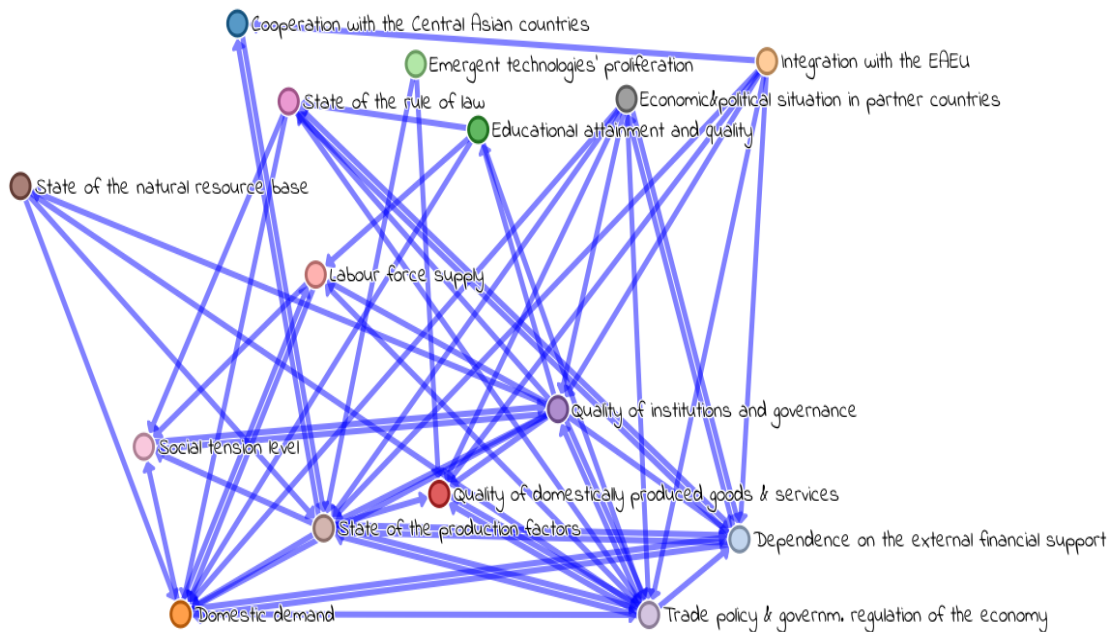


Figure 9. Influence Diagram of the 15 major factors

Therefore, five major factors were identified as drivers and potential scenario dimensions. Then, polar (opposite) values to each of the drivers were set (see Figure 10).

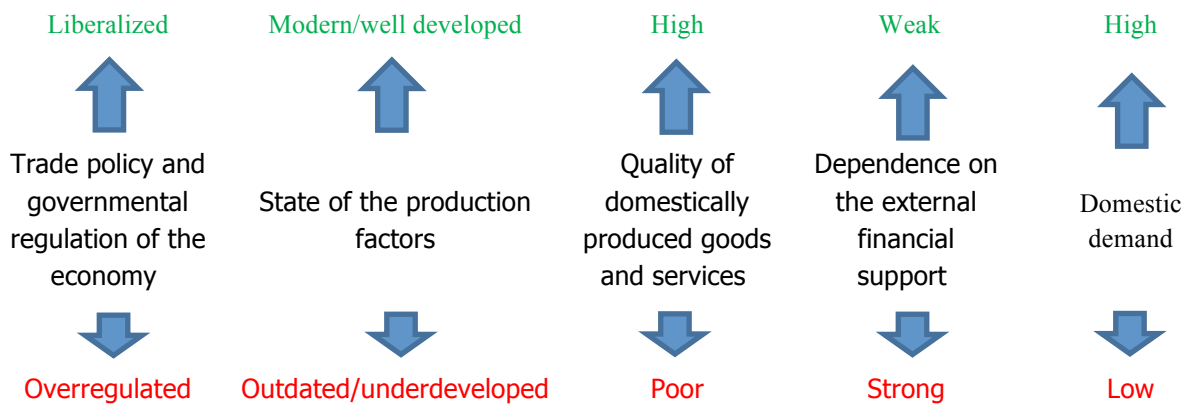


Figure 10. The critical drivers of the industrial development of Kyrgyzstan and their polar values.

Thus, a total of 32 (2^5) possible combinations of the critical uncertainties values were specified. Six out of them were identified as plausible by two independent groups of IIASA experts. These embraced the scenarios – “Modern yurt” (1A), “Khagan’s fortress” (1B), “Assembly shop” (2), “Sand castle” (3), “Falling tower” (4A) and “Abandoned palace” (4B) (Table 3). The augmented Scenario Matrix (Wulf, Brands, & Meissner, 2010) is shown at Figure 11.

Table 3. The major drivers and plausible combinations of their polar values shaping six scenarios.

Scenarios	1A	1B	2	3	4A	4B
Major Drivers	Modern yurt	Khagan's fortress	Assembly shop	Sand castle	Falling tower	Abandoned palace
Dependence on the external financial support	no dependence	weak	strong	strong	strong	strong
Domestic demand	high	high	low	low	low	low
Quality of domestically produced goods and services	high	high	high	low	low	low
Trade policy and governmental regulation of the economy	liberalized	over-regulated	over-regulated	over-regulated	liberalized	over-regulated
State of the production factors	developed	developed	developed	developed	under-developed	under-developed

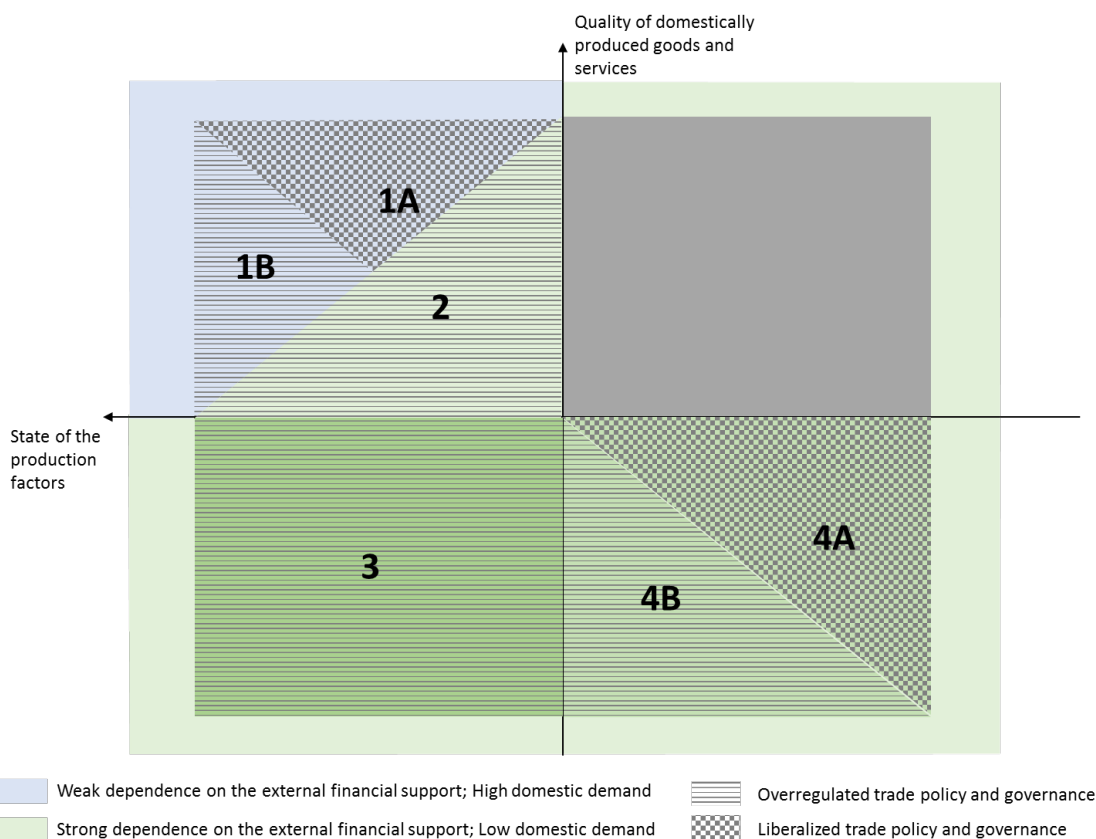


Figure 11. Augmented Scenario Matrix. Areas with different colors denote different scenarios.

Using the Influence Diagram and supporting materials (strategic documents, related research, including (Shaimergerenov et al., 2017; WEF, 2014), interviews with experts, media etc.), narratives for the six scenarios

were created. The names for the scenarios were chosen in order to highlight their essence (e.g., a strong or weak central power) through the allegory with different types of buildings.

The employed approach is rather illustrative than predictive by construction; usually it is reported to have a robust performance. It is best used to test the strategic management in the medium and long term to see how stable it is in different environments. Scenarios developed using this method typically cover a prospect of 10-20 years. The typical scenario matrix method generates four distinct scenarios for an area of interest, placing an important factor influencing the future of the object of the study on each of the two axes that intersect in the form of four quadrants. The factors chosen for the axes should have high impact and, at the same time, high uncertainty to ensure that all four alternatives defined by their intersection are clearly differentiated. These alternatives are developed then into script narratives, reflecting the impact of other events and trends in addition to those represented on the two axes. An extended scenario matrix allows to introduce more than two dimensions (in our case, five), however, the number of possible alternatives grows exponentially, so filtering out the implausible combinations is often applied (cf. the World Economic Forum scenarios often consider only three out of four possible alternatives in a two-dimensional scenario matrix, discarding the fourth one as unlikely to be probable (WEF, 2014)).

Disclaimer: The produced scenarios are just a basis for the further detailed analysis and identification of possible opportunities and risks for the future development of Kyrgyzstan. The further understanding of the national strategies should be dealt by specialized governmental structures.