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Overview of the Kazakhstan's Agro-Industrial Complex and Pestle Analysis for Its Sustainable Development

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This paper presents an overview of the Kazakhstan's agro-industrial complex situation and its potential for innovative and sustainable development. Despite a range of efforts by national and local stakeholders to increase productivity in agriculture, nearly 65-70 percents of main food products are still imported from the foreign countries. In addition to this, 80% of agricultural machinery depreciated in the country, which is one of the main obstacles in moving toward sustainability. Kazakhstan's agriculture policy targets and drivers are also discussed in the paper. Based on the current situation, a PESTLE analysis is provided outlining a novel thinking for addressing the political (P), economic (E), social (S), technological (T), legal (L), and environmental (E) challenges that constrain the development of agro-industrial complex in Kazakhstan.

JEL Codes: Q01, Q10, Q13, Q18.

1. Introduction

Effective development of agro-industrial complex depends to a great extent on how successfully knowledge is generated and applied, and indeed knowledge intensiveness has featured prominently in most strategies to promote its development. Agricultural science, technology, and innovation are vital to promoting rural development and poverty reduction. To this end, many studies on agricultural research, extension, and education have highlighted the importance of public investment and policies in these areas. However, as innovations in agro-industrial complex becomes increasingly viewed as a complex process that defies simple solutions, it has become more and more difficult to identify the types of investment and policy interventions needed to make developing-country agriculture more responsive, dynamic, competitive and sustainable.
Agriculture is one of the key sectors of the Kazakh economy. As the 9th largest country in the world – larger than the entire Western Europe – there is a massive potential to increase the deployment of agricultural land in Kazakhstan.

More than 74 percent of the country's territory is suitable for agricultural production, representing only 5.5 percent of GDP and employing over 20 percent of the labor force, with 43 percent of the population living in rural areas.

The current state of Kazakhstan's agro-industrial complex is characterized by fairly low productivity, dependence on exports of a number of important foodstuffs, a low level of attraction of investments, outdated scientific and technical infrastructure, the aging of the scientific staff and other complicated problems. While developed countries in the world are moving toward sustainability in agriculture, Kazakhstan can barely ensure food security, not to mention the groundbreaking technologies in this field. Therefore, the necessity of new approach in analyzing and governing agro-industrial complex of Kazakhstan is unmistakably apparent, which is possible only providing an innovation and technological development.

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2. Literature Review

Technological change has been a major factor shaping agriculture in the last 100 years (Schultz, 1964; Cochrane, 1979). Internationally, tremendous changes in production patterns have occurred. While world population more than doubled between 1950 and 1998 (from 2.6 to 5.9 billion), grain production per person has increased by about 12 percent, and harvested acreage per person has declined by half (Brown et al.,1999). These figures suggest that productivity has increased and agricultural production methods have changed significantly. Added to this, the rising demand for agricultural products is contributing to dramatic changes in land use, and ultimately to a changing global climate around the world.

It is estimated that agriculture is a major driver of human-caused climate change, contributing anywhere from 25 to 30 percent of global greenhouse gas emissions, depending on the analysis. This is due in part to agriculture's sheer scope: according to the IPCC, agricultural lands occupy 40 to 50 percent of Earth's land surface. Agriculture also accounts for 70 percent of human freshwater use, contributing to its significant environmental impact. At the same time, agriculture also holds an important key to mitigating climate change (Reynolds and Nierenberg, 2012).

Group of researchers led by the Giovannucci (2012) concludes that due to remarkable changes in the world agriculture sector is at the necessary paradigm shift. They also emphasize the pressing need for new approaches in policies and structures, reflected in "better" production and better food systems, rather than simply "more" production. It is obvious, that technological and innovational shifts are vital in that case.The classification of innovations according to form is useful for considering policy questions and understanding the forces behind the generation and adoption of innovations (Sunding and Zilberman, 2000).

Although many of agricultural strategies have been successful, they may no longer be sufficient in many countries, where agriculture is increasingly subject to rapid and unpredictable change. The perceptions of what constitutes "research capacity" and how innovation occurs are being transformed, along with approaches for investing in the capacity to innovate. It is now clear that investing in the creation of stronger research systems the primary focus of agricultural research investment in the 1980s and 1990s may increase the supply of new knowledge and technology, but it may not improve the wider capacity for innovation throughout the agricultural sector (Rajalahti et al., 2005). According to World Bank report (2006), more recently, attention has focused on the demand for research and technology and on the development of innovation systems. An "innovation system" is a network of organizations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organization into economic use, together with the institutions and policies that affect the system's behavior and performance.

Agricultural innovation, which includes the successful development of new or traditional practices, their tailoring to the local needs of farmers, farm cooperatives and agri-business, and their adoption and up-scaling, requires adequate capacities on all levels of decision making. However, low-income countries often lack the resources and capacities to fully develop their innovation systems (Aerni et al., 2015).

Kazakhstan moved toward the market economy after becoming independent from the Soviet Union in 1991. The first steps to research agro-industrial complex by the new standpoint were taken by Belgibayev (1991). Not surprisingly, after the collapse of the USSR Kazakhstan inherited different institutional problems and faced enormous challenges in building a new economy. During this period, agro-industrial complex of

country was suffered a long crisis ended up at declining almost all indicators in that sphere of economy.

In 2000s, Kazakhstan became one of the fastest-growing countries in the world, causing development in all sectors of economy. Since then, studies and researches have been developed too. For example, domestic scientists like Espolov, Belgibaeyev and Suleimenov (2005) considered features of new agriculture economy, whereas Kaigorodcev and Ospanov (2006) started to do researches about food security in Kazakhstan. Omarbakiev (2008, 2010) made an remarkable contribution in researching of innovative development of agro-industrial complex and evaluated the effectiveness of innovative projects in this sector.

Despite number of researches and their results in agro-industrial complex in Kazakhstan, only few of them were dedicated to consider it through the prism of sustainability. Because, issues on sustainable development and green new technologies that allow sustainability and effectiveness in agriculture occurred only few years ago in our country. Consequently, it is the relatively new field for research. In addition, poor infrastructural conditions in agro-industrial complex, lack of investment and qualified personnel hinder to paying much attention to these issues.

3. Methodology and Data

Unlike the SWOT analysis, which identify issues in generalised categories of strengths, weakness, opportunities and threats (Kotler et al., 2010), a PESTLE analysis classifies issues as political (P), economic (E), social (S), technological (T), legal (L) and environmental (E). The term has been widely used and the earliest reference can date back to a book by Aguilar (1967) who discussed ETPS (Economic, Technical, Political, and Social) in his book Scanning the Business Environment. Shortly after its publication, Brown for the Institute of Life Insurance (in the US) reorganized it as 'STEP' as a way to organise the results of his environmental scanning. This was further modified and became known as the STEPE analysis – Social, Economic, Political, and Ecological factors (Brown and Weiner, 1984).

PEST or PESTLE analysis is dedicated to identify list of factors which related to external environment. At the first sight, it may seem easy to do so, but developing a clear understanding of the cause-and-effect relationships between the factors is more challenging (Tovstiga and Aylward, 2008). Collins (2010) stated that PESTLE analysis is frequently presented as a mechanistic, "key-word" driven analysis tool. Thus, he developed a transformational convention called PESTLEWebTM enabling deeper reasoning and insight into the environment under consideration.

The PESTLE analysis headings are a framework for reviewing a situation, and can be used to review a strategy or position, direction of a company, a marketing proposition, or idea. Nowadays, PESTLE analysis is also used to investigate the external environment of whole sector of economy like the alternative to SWOT analysis (Zalengera et al., 2014).

The data presented is based on reports from government and public institutions of Kazakhstan, a range of online resources and first-hand information by the involvement of the authors in the research project related to the topic. Necessary measures were taken to ensure that reference is made to the most recent documents and data; but this may be limited by overdue official reviews for the country.

4. A Pestle Approach for Sustainable Development of Agro-Industrial Complex in Kazakhstan

In view of the situation presented above, a PESTLE analysis is discussed in the next sub-sections in order to provide a comprehensive framework for addressing the challenges facing the Kazakhstan's agro-industrial complex toward sustainability.

4.1 Political

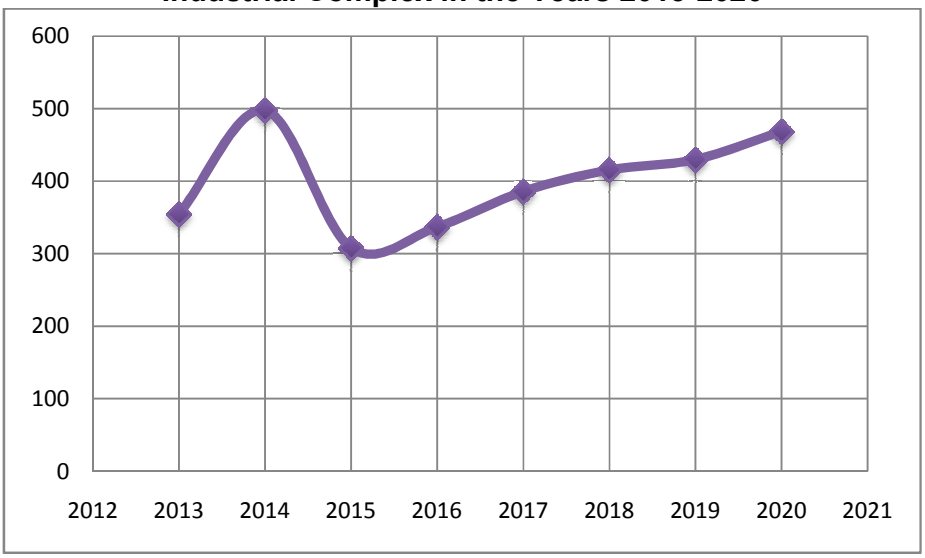
Since the trends in the development of innovative processes in the agricultural sector is directly determined by the political situation in the country, the economic situation and investment climate, the role of the state in resolving the impact of these processes on the growth rate of the agricultural sector is large enough to underestimate her.
Kazakhstan completed the entry into WTO in 2015. Accession to the WTO will lead to increased competition in the consumer market, especially as concerns agriculture. Developed WTO member countries, carrying out a large-scale support to their agricultural producers, it is prohibited to new members of the WTO. At the same time its own import duties for agricultural products in these countries is significantly higher than those they impose on the negotiation process to other countries.
The Customs Union has brought a positive result Belarusians and Russians, who received an additional 17 million market in Kazakhstan. Kazakhstani business has received new and stronger competitors. Kazakhstan exports to Russia fell by 3.6%, to Belarus by 13.7%, imports of Russia in Kazakhstan increased by 13.8, Belarus - 11.6%. The weakness of the position of Kazakhstan manufacturers on the market of the Customs Union has threatened the food security of the country.
The Government of Kazakhstan approved a new program of agro-industrial complex development for 2013-2020 "Agribusiness – 2020" in February 2013. The Agribusiness-2020 Program aims at developing four dimensions: financial recovery, increase of affordability of products, works and services for the agro-industrial sector entities, development of the state system of agricultural producers support, improvement of efficiency of the state management system of the agro-industrial complex.

4.2 Economic

An analysis of the current policy of state regulation of development of agriculture shows that monetary and financial support instruments are dominated in Kazakhstan.
In 2001s, the volume of loans in the economy has grown almost 18 times. Lending to agriculture by banks has also increased, but at a much smaller scale - just 3.88 times for the period 2003-2011. The volume of loans amounted as of September 1, 2011, more than 545 billion. tenge. Over the past 5 years, the annual volume of investments into fixed capital in agriculture increased by almost two fold, namely from 56 bln. tenge in 2007 to 107.4 billion. tenge in 2011. The relative investment attractiveness of the agrarian and industrial complex of Kazakhstan in comparison with other sectors over the years has not increased.
Labour productivity in agriculture is the lowest in the country. The existing level of technical equipment of agriculture hinders the effectiveness of its development. All this adversely affects the timing and quality of seasonal agricultural work. Not having the necessary machinery and equipment, poor access to cheap and long-term credit resources, agribusiness entities are forced to use simplified technologies in production and processing of agricultural products. The high cost of agricultural machinery, spare parts, equipment, short-term bank loans and lease does not allow you to update the basic means the vast majority of agro-industrial complex.

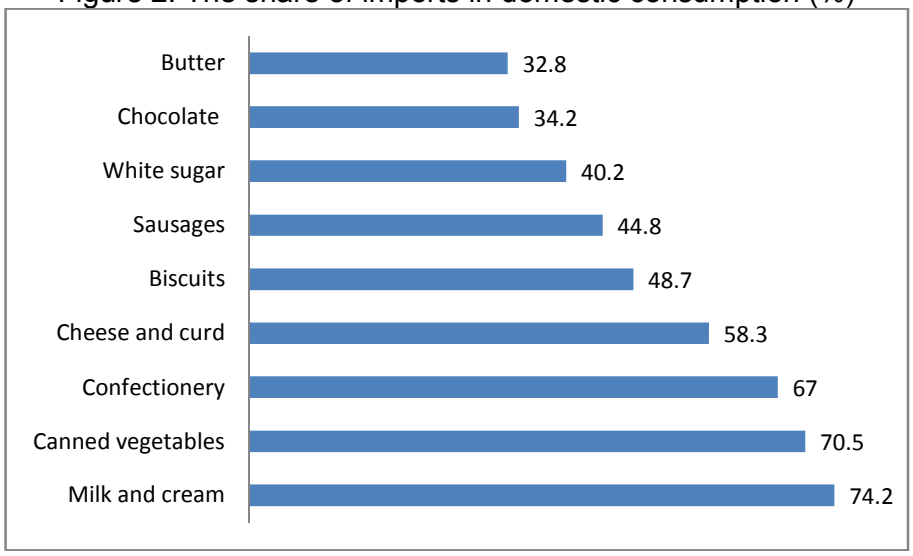
Total amount of money which will be allocated from the national and local budgets for the implementation of the program during 2013-2020 would amount to 3 122,2 bln. tenge (Figure 1), including:
-2013 year to 339.7 billion tenge;
- 2014 - 466.0 billion tenge;
- 2015 - 322.7 billion tenge;
- 2016 -340.7 billion tenge;
- 2017 - 383.5 billion tenge;
- 2018 - 406.9 billion tenge;
- 2019 - 414.3 billion tenge;
- 2020 - 448.4 billion tenge.

Figure 1: The Dynamics of the Allocated Funds for the Development of Agro-Industrial Complex in the Years 2013-2020



Despite a huge amount of money allocated for the development of agro-industrial complex, dependence on imports is formed in Kazakhstan for many types of processed products, because of a high level of dependence on imports of fruit and vegetables, meat and milk (Figure 2).
Kazakhstan imports a number of basic food "market basket" - 34.2% of the total consumption of vegetable oils, 17.5% - dairy products and 15% of pasta. In the United States and France, the level of food self-sufficiency is 100%, Germany - 93%, in Italy - 78%.

Figure 2. The share of imports in domestic consumption (%)



The increase in domestic production of food could help improve the structure of social production, as the successful development of the food industry encourages the development of agriculture and related industries.

4.3 Social

According to estimates by demographers, during the XXI century the world population will double, therefore it is necessary to increase food production by 2-3 times to ensure the viability, and to ensure the material well-being even 5-10 times. Population growth leads to the need to develop the agricultural sector, the introduction of new technologies in agriculture, increase in earmarked funding of science.
Therefore, from the standpoint of food to the world in the XXI century, there are three problems: a) to provide food growing demand for food from a growing and increasingly wealthy population; b) to make it stable in terms of the environment; c) deal with the problem of hunger.
The shortage of qualified staff is one of the main problems in Kazakhstan. In the agricultural sector, the shortage of qualified workers is 30-50%,regarding managers and specialists – 11-17%. The biggest lack of stuff is related to specialists such as machine operators, tractor drivers, and operators of milking machine, agronomists, livestock specialists and veterinarians. The main reasons for that are the low reputation of rural life, especially among the young, low wages, seasonal work, and others. The deficit of qualified labor force, it is also due to aging and changes in the structure of the workforce.

4.4 Technology

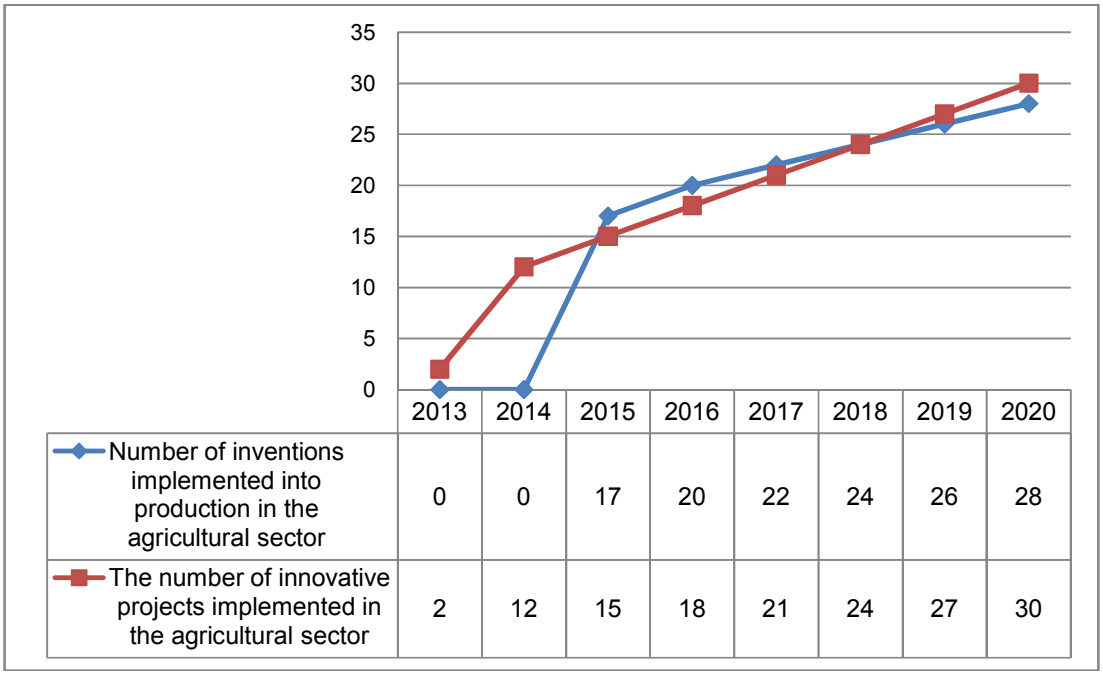
Eco-friendly technologies reduce environmental problems, stimulated by consumer preferences, so successful in the market and have good financial results. It is predicted that the size of the market of clean technologies in the world will grow to $ 2 trillion. 2020.However, in recent years, not only in agriculture, but also in the whole of Kazakhstan there was a decline of innovative activity. Kazakhstan is experiencing a deep crisis of innovation and investment in the agricultural sector.
One of the problems is the lack of linkages with the manufacturing industry science and the limited participation of private capital in the financing of R & D (Alimkulova, 2009).

According to estimates of the susceptibility of enterprises to the innovation process characterized by share of active enterprises, their innovation activity in 2011 amounted to 4.3%. For comparison, the share of innovation-active enterprises in the US is about 50%, Turkey-33%, Hungary – 47%, Estonia – 36%.

To implement the program financing in the framework of the budget program 212 "Research and activities in the field of agriculture and nature" in 2014 achieved the following results: the state variety trials transferred 110 varieties and hybrids of agricultural crops, 51 recommendations on technology were developed. 166 security documents for intellectual property were obtained, including received 10 patents for inventions; 83 innovative patents for invention, 72 patents for selection achievements (Mamytbekov, 2015).

We analyzed the promotion of agro-business through the introduction of commercial and industrial use of advanced technology and know-how. We see that there are key indicators for the development of innovations in agriculture (Figure 3).

Figure 3: Indicators for the implementation of the results of agricultural science in Kazakhstan



	2013	2014	2015	2016	2017	2018	2019	2020
Number of inventions implemented into production in the agricultural sector	0	0	17	20	22	24	26	28
The number of innovative projects implemented in the agricultural sector	2	12	15	18	21	24	27	30

Despite this, there is depreciation of assets of enterprises and technology obsolescence. Currently, 80% of agricultural machinery depreciated in the country, despite the dynamic growth of the absolute number of machines and equipment. The average age of more than 80% of combine harvesters and tractors of 13-14 years, when regulatory useful life of 8-10 years, 93% of tractors, combine harvesters 71% et al., there is deterioration in the range 87% in existing park of agricultural machinery in general, energy supply in the village of 3-5 times lower than in developed countries, more than 80% of the livestock equipment is completely depreciated (Beisengaliyev, 2010).

The main aspects of the development of the agricultural complex is to ensure the continuous expansion of reproduction of fixed productive and non-productive assets, modernization of production facilities based on the widespread introduction of the domestic production of high technology, based on the latest achievements of science and technology.

4.5 Legal

It should be noted that the Government of the Republic took concrete measures aimed at improving the competitiveness of agro-industrial complex of the country. In particular, appropriate legal and regulatory framework within which adopted Law of the Republic of Kazakhstan "On state regulation of development of agriculture and rural areas"; a three-year program of development of the village (2003-2005), The concept of sustainable development of agriculture of the Republic of Kazakhstan for 2006-2010.; The program of priority measures for 2006-2008 to implement the concept of sustainable development of agriculture of the Republic of Kazakhstan for 2006-2010. However, the efficiency of the implementation of the said documents is still quite low.
In this regard, it is appropriate is the development and adoption of the bill - "On the areas of agricultural production in the Republic of Kazakhstan." The document, in the opinion of expert Erasylova (2008), should be at the state level to define: in what areas and production of any kinds of products will be supported by the state.
The tools for implementing specific tasks of the Concept by sector are the existing program documents as amended and supplemented with respect to the implementation of the main areas of the Green Economy Concept, such as the Program of Agro-Industrial Complex Development for 2013-2020 (Agribusiness-2020), the State Program for Expedited Industrial and Innovational Development of Kazakhstan in 2010-2014, National Education Development Program of Kazakhstan in 2011-2020, local development programs, strategic plans of governmental bodies, Zhasyl Damu Industry Program for 2010-2014 and other industry programs that will be updated to include new areas of focus such as on air quality, waste management, prevention of desertification and land deterioration, improving soil fertility, development of fisheries, aquacultures and fish breeding (Essekina, 2014). The plan is also to develop the State Program for Water Resource Management for 2014-2040.

4.6 Environmental

Over the past 250 years the average temperature on the earth's surface has risen on 1,4oS, and 0,8oS of them occurred in the last 50 years. The consequence of climate change is the participation of droughts, abnormally hot weather in regions where previously these phenomena were observed. The territory of Kazakhstan was not an exception: all the more common phenomena such as drought, hurricane, landslide, etc.
There is a certain imbalance in the issues of land use and soil conservation. A significant amount of agricultural land transferred to the long-term lease, is not used for its intended purpose, or used minimally. On the agricultural land used by the tenants are not sufficiently effective measures to conserve soil fertility and prevent wind and water erosion. According to the Committee for Land Management of the Ministry of Regional Development of Kazakhstan, up to 15% of agricultural land in the Republic of Kazakhstan are used irrationally. Today, about 125 million hectares of pastures are flooded and not used. In addition, more than 20 million ha of pasture adjacent to settlements, due to irrational use is classified as degraded.
In order to maintain soil fertility and reproduction, rational use of fertilizers and to create on this basis, the conditions for sustainable agricultural production is necessary to carry out regular monitoring of soil fertility on agricultural lands.

5. Research Findings and Results

Considering the relationship between "social" factors and "economy", it can be seen that "population growth" increases the demand for agricultural and food products, the

level of production, including export-oriented production, and thus affects the "economy" solving the problem food security.
Relations between "society" and "economy" is such that "society" in order to ensure food security of the country requires a "policy" of providing state support for sustainable agricultural production. At the same time, agriculture should not harm the environment and taking into account the priority of "green" economy, should move to the production technology of environmentally friendly products, non-waste technology for processing agricultural raw materials.
"Ecology", for its part, affects the "technology" requiring the development of new resource-saving technologies, creating a stress-resistant varieties, crops, technology, management of natural resources, the creation of non-waste technology of processing of raw materials, reducing the level of contamination in the manufacturing process and others.
"Ecology" affects "the economy" and through "green" technologies, environmentally friendly markets. At the same time, requiring the "politics" of the policies aimed at creating eco-friendly products and the adoption of measures to minimize the impact of climate change.
Based on the analysis of global challenges, trends and factors of development, using the methodology PESTLE, key variables at the macro level in six areas were selected and presented in the Table 1.

Table 1: The Factors Determining the Development of Agro-Industrial Complex in Kazakhstan According to Pestle Analysis

The factors determining the development of agro-industrial complex					
P (Political)	E (Economic)	S (Social)	T (Technology)	L (legal)	E (Environmental)
1. WTO accession 2. Participation in the Customs Union 3. State support at various levels	1. Low investment attractiveness 2. The high level of lending by the state 3. Low productivity 4. High dependence on food imports	1. Lack of qualified staff 2. Poor infrastructure in rural areas 3. Low image of agricultural professions	1. Depreciation of tangible assets 2. Low innovation activity 3. Lack of communication between science and industry 4. Food security	1. Availability of good legal framework 2. Acceptance of the concept of the transition to a green economy	1. Global climate change 2. Soil degradation 3. Natural disasters

6. Conclusion

The current global economic crisis, rising food prices and the threat of climatechange have reinforced the urgency to find lasting solutions to Kazakhstan’s agro-industrial challenges. The use of emerging technology and indigenous knowledge to promote sustainable agriculture will require adjustments in existing institutions. New approaches will need to be adopted to promote close interactions between government, business, farmers, academia and civil society. Positioning sustainable agro-industrial complex as a knowledge-intensive sector will require fundamental reforms in existing learning

institutions, especially universities and research institutes. Most specifically, key functions such as research, teaching, extension and commercialization need to be much more closely integrated.

Analysis of current trends in the development showed that the further development of the agro-industrial complex of Kazakhstan should focus on improving the competitiveness of agricultural products by improving the efficiency of government support and creating equal favorable conditions for development of agribusiness.

References

Aerni, P., Nichterlein, K., Rudgard, S., Sonnino, A. 2015 “Making Agricultural Innovation Systems (AIS) Work for Development in Tropical Countries”, Sustainability, 7: 831-850.

Aguilar, F.J. 1967 Scanning the Business Environment. New York: The Macmillan company.

Alimkulova, E.S. 2009 “Features of the development of innovation in the agricultural sector”, “Izdenis-Poisk”, 2:11-14.

Beisengaliyev B.T.2010 Innovation and technological development of the agro-industrial complex of Kazakhstan: Theory and Practice – Abstract of the thesis for the degree of Doctor of Economics. Astana.

Belgibayev, K. 1991 The economy of agriculture. Almaty: Kainar.

Brown, A.,Weiner, E. 1984 Supermanaging: How to Harness Change for Personal and Organisational Success (New York: McGraw Hill, 1984).

Brown, L.R.,Gardner, G., Halweil B. 1999 Beyond Malthus. Nineteen Dimensions of the Population Challenge, The Worldwatch Environmental Alert Series. New York: W.W. Norton & Company.

Cochrane, W.W. 1979 The Development of American Agriculture: A Historical Analysis. Minneapolis: University of Minnesota Press.

Espolov, T., Belgibayev, K., Suleimenovm J. 2005 The agrarian economy. Almaty: KazNAU.

Erasylova, A. 2008 “Prolems of agricultural production in Kazakhstan today”, Analytics, 5.

Essekina, B.K. 2014 "Green" economy: international experience and Kazakhstan. Borovoe: Research and Education Center"Green Academy.

Giovannucci, D., Scherr, S., Nierenberg, D., Hebebrand, C., Shapiro, J., Milder, J., Wheeler, K. 2012 Food and Agriculture: the future of sustainability. United Nations Department of Economic and Social Affairs.

Mamytbekov, A.S. 2015 Report to the Minister of Agriculture Mamytbekov A.S at the session of the Government of Kazakhstan on May 12, 2015. Astana.

Kaigorodcev, A., Ospanov, E. 2006 "The food security of Kazakhstan: theory and practice", KASU bulletin, 4.

Kotler, P., Berger, R., Bickhoff, N. 2010 The Quintessence of Strategic Management: What You Really Need to Know to Survive in Business. Springer.

Omarbakiyev, L. 2008 "The effectiveness of innovative projects in agricultural sector of Kazakhstan", Finance, 5-6: 30-37.

Omarbakiyev, L. 2010 "Innovative development of agro-industrial complex of Kazakhstan, Problems of agriculture, 3:27-30.

Rajalahti, R., Woelcke, J., Pehu, E. 2005 Development of Research Systems to Support the Changing Agricultural Sector: Proceedings. Agriculture and Rural Development Discussion. Washington, DC: The World Bank.

Reynolds, L., Nierenberg, D. 2012 Innovations in Sustainable Agriculture: Supporting Climate-Friendly Food Production. Washington, D.C.: Worldwatch Institute.

Schultz, T.W. 1964 Transforming Traditional Agriculture. New Haven: Yale University Press.

Sunding, D., Zilberman, D. 2000 The Agricultural Innovation Process: Research and Technology Adoption in a Changing Agricultural Sector. Handbook of Agricultural Economics.

Tovstiga, A., Aylward, M. 2008 Strategic direction. Study Guide. Henley Business School.

The World Bank 2006 Enhancing Agricultural Innovation: How to Go Beyond the Strengthening of Research Systems. Washington, DC: The World Bank.

Zalengera, C., Blanchard, R.E., Eames, P.C., Juma A.M., Chitawo M.L., Gondwe K.T. 2014 Overview of the Malawi energy situation and A PESTLE analysis for sustainable development of renewable energy. Renewable and Sustainable Energy Reviews, 38: 335-347.