

NEW INDUSTRIALIZATION'S INNOVATIONAL IMPACT ON CLIMATE CHANGE

Assoc. Prof. Dr. Assiya Agumbayeva¹

Abdirov Yergalym²

¹ Saken Seifullin Kazakh agrotechnical University, Kazakhstan

² Collegium Civitas, Poland

ABSTRACT

Despite on industrialization is the key to wealth but it affects our environment and contributes to climate change. Industrialization involves technological innovations and the economic transformation of the human society. Industrialisation causes the challenges in the environment by raising of higher temperatures, extreme weather conditions, water and land quality as a result as well as decreasing the number of rare animals. All these issues show us that industrialization must take into account climate change and its consequences. This paper examined the links between industrialization and climate change and attempted to address some arguments which always come up when the effects of human beings on climate change is discussed.

The article is devoted to the modernization of the economy, the main directions of which are the new industrialization and the formation of a post-industrial (information) economy based on higher technological structures. It is noted that the modernization processes should eventually allow moving from the export-raw material strategy of the country's economy to innovation. At the same time, they should be accompanied by social and environmental effects through the development of environmentally friendly economic activities, the use of "green" innovative technologies and environmentally friendly equipment. In this regard, the article discusses the approaches of the main technological powers (USA, China, Japan, CIS (Kazakhstan, Russia)) which have just started the transition to neo-industrialization, and those countries that already have accumulated experience in this direction.

This article discusses the role of the developing world in ensuring global environmental security. Many countries around the world are committed to reducing the environmental burden of industry. (Germany, France, etc.). However, despite the diversity of countries and the diversity of their economies, environmental degradation has a common component and is associated with the development of an industrial society with its inherent value orientations to increase growth rates. However, for many scientists, solving environmental problems is important not only for ensuring environmental sustainability, but also for maintaining long-term economic growth. This position raises the question of the need for developing countries to move to a new model of "eco-industrial" revolution. In this regard, this article will consider two opposite sides of the problem of the impact of new industrialization on the level of environmental quality.

This article is devoted to the problem of climate change through the discussion of the ongoing new industrialization in the world, the current state in solving the problem on a global scale. At the same time, the article offers a discussion of the opposite opinion on the relationship between new industrialization and economic growth reducing the burden on the environment. This discussion is a new direction of this study for the upcoming study.

Keywords: *industrialisation, weather changing, climate change, GHG (green house gases), policy.*

INTRODUCTION

The industrialization has been described as the process of transformational change of the human society socially and economically from an agrarian society into an industrial one. It generally involves technological innovations and is a part of a wider modernization process, where social change and economic development are closely related with these technological innovations. [1].

Studies of improvement of terms “industry”, and “industrialisation” in different countries show the importance of it from different points of view (Reich, 1982; Landesmann, 1992; Chang, 1994; Huck and Konrad, 2004; Goh, 2005). Reich (1982) defined industrial policy as a set of government actions aimed at supporting sectors that have export potential and employment potential, as well as the ability to stimulate infrastructure production. [2] Landesman (1992) considers that the priority in industrial policy is the selectivity of industrial policy. So, Landesmann comments that industrial policy as a tool for discrimination and choice between different sectors and industries. Although, policies should be developed for each branch of industry separately.[3] Chang (Chang, 1994) defined industrial policy as a state activity based on the creation of production and technological potential in strategic sectors of the economy. Chang believed that such discrimination between different sectors was based primarily on their potential to stimulate economic development in the country. [4] As for Huck and Konrad (2004) they believe that an increase in national income is possible by increasing the competitiveness of local producers compared to foreign producers, creating a cohort of the best producers and subsidizing joint firms. [5] According to Goh (Goh, 2005), he wrote that the Government of Singapore tried to encourage its entrepreneurs to a more active entrepreneurial spirit in the global market. [6] In order to raise the level of Singaporean specialists in accordance with the standards, to be consistent in the global market, as well as to trade and create factories abroad. To conclude, in the new global economy, industrialisation has become a central issue. Today it makes sense to ask “how it works” during industrialization processes rather than “why it so works”.

The newly industrialized countries (NIC) are a group of developing countries that have experienced a qualitative leap in socio-economic indicators in recent decades. The economies of these countries have in a short time made the transition from the backward, typical of developing countries, to the highly developed, with all the inherent features of the latter. These include the following: NIC "first wave": Republic of Korea, Singapore, Taiwan, Hong Kong (also called "Asian tigers" or "

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dragons"); Second wave NIC: Argentina, Brazil, Chile, Mexico, Uruguay (Latin American Cougars"); Third wave NIC: Malaysia, Thailand, India, Cyprus, Tunisia, Turkey, Indonesia; Fourth wave NIC: China, Philippines, Vietnam.

Two continental models have emerged in the development of these groups of countries. The first is the Asian model: the development of the national economy with a predominant focus on the foreign market on the basis of borrowed technologies, with strong state support. The second is the Latin American model: the development of the national economy with a focus on import substitution based on the involvement of American TNCs and Transnational banks. At the same time, all these new industrial countries have revealed some characteristic features in development, in particular the following. They show the highest rates of economic development (8% per year for NIC of the first wave), and during the global crisis in most of them there was no deep recession, there was only a drop in growth rates. The leading industry in these countries is manufacturing. All these countries have an export-oriented strategy, hence the increased importance of foreign markets. These countries are involved in active regional integration (LAI, MERCOSUR, ASEAN, etc.) A number of these countries are in the process of dynamic formation of their own TNCs, successfully competing with the leading TNCs of the world. Much attention in NIS is paid to education and science, the development of modern technologies and human capacity building in general. In these countries, the use of high technologies based on the cluster approach and partly outsourcing is developing extremely effectively.

All these countries are very attractive to TNCs because of the cheapness of the labour force, the availability of significant raw materials, the development of the banking and insurance sectors and the creation of a favorable "business climate". The main distinguishing feature of these countries is the production of household appliances and computers, clothes, shoes, toys, and in large volumes for export to world markets. All these countries are rapidly developing the international tourism industry, which includes elements of business and commercial services. But for developing industrialisation processes in countries mentioned above the electric power industry is the basic branch of their countries. Reliable and efficient functioning of the industry, stable supply of electricity and heat to consumers is the basis for the development of the economies of the countries and an integral factor in ensuring civilized living conditions of the population. The imperfection of ecological legislative bases of the countries of the world, tools and mechanisms of state regulation of ecological aspects of the activity of the campaigns working in this sector of the industry lead to high technogenic loadings on ecosystems of the planet. Analysis of the development of the electric power sector of the economies of the world is important in terms of forecasting the reliability and energy supply of the country's economic growth. The electric power industry due to the fact that it is represented mainly by coal-fired power plants, has a very strong negative impact on the health of the population in the industrial centers of the world, as well as on the state of local ecosystems [7]. The level of impact of enterprises on the environment depends on two factors: the environmental legislation and its implementation mechanisms; the state of fixed assets, their technological level and the utilization rate of the installed capacity of enterprises.

Climate change is a change in the weather pattern impacted by anthropogenic activities. As it was defined one of the major drivers of climate change is global warming. It was distinguished by Shah [8] who believes that global warming refers to an increase in average global temperatures around the world. As a result topic “climate change” has been the basic of different international debates. Different events in nature and examples of human activities are believed to be contributing to an increase in average global temperatures. One thing that has been shown to be certain is humanity has some impact on the global climate and heightened human action has contributed to the alteration of the face of the earth. Pittcock, A. (2005) believes that the climate has changed visibly, tangibly, measurably. An additional increase in average temperatures is not only possible, but very probable, while human intervention in the natural climate system plays an important, if not decisive role. Extreme weather events are part of climate. Their impact is reflected in the design of human settlements and activities so as to be able to survive floods, droughts, severe storms and other weather-related stresses or catastrophes. Climate change induced by human activity may occur due to changes in the composition of the Earth's atmosphere from waste gases due to industry, farm animals and land clearing, or changes in the land surface reflectivity caused by land clearing, cropping and irrigation. Delayed climate responses to greenhouse gas emissions require early action. Scientific research in the latter half of the twentieth century led many climate scientists to alert governments to the issue of climate change. [9] Shoufu Lin et al. (2009) considered that “population has the largest potential effect on environmental impact, followed by urbanisation level, industrialisation level, GDP per capita and energy intensity”. [10] Nair K. S. (2009) believed that “industrialisation and urbanization are dividing the society in terms of income and facilities. All these issues are likely to worsen under a changing climate when the competition increases for better living conditions”. [11] Goodman, J. (2012) wrote that “climate change both reflects and transforms global development. Asymmetries of responsibility, impact and capacity reflect historical and current development hierarchies. At the same time, the imperative to reduce greenhouse gas emissions perversely empowers high-emitting newly industrialising countries. As inter-state negotiations enter a new post-Kyoto paradigm involving emissions reductions for ‘all Parties’ to the UN climate change convention, relations between industrial and industrialising countries, and more broadly between North and South, are re-orientated”. [12]

RESULTS

Emphasizing the natural causes of climate change, Pidwirny [13] stated that external and internal factors could lead to changes in the state of the earth’s climate system. External factors involve effects from space systems. Internal factors involve ocean, atmosphere and land systems. A study of past episodes of climate change has found evidence to suggest that only a limited number of factors are primarily responsible for the climate change on the earth. These factors include: variations in the Earth's orbital characteristics; atmospheric carbon dioxide variations; volcanic eruptions; variations in solar output [13]. Global warming has been generally agreed to be caused primarily by the emission of greenhouse gases, chlorofluorocarbons and other chemicals into the atmosphere [14]. The

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accumulation of these gases in the atmosphere results in a heightened “greenhouse effect” which leads to global warming with local temperature, humidity, wind speed, precipitation, soil moisture and sea level anomalies, it has also been recorded to have led to global cooling in some previous era [15]. On the other hand, according to vocabulary an increase in aerosols in the atmosphere, also due to industrial emissions, cools the earth through a reflection of solar radiation back into space.

The greenhouse effect is a natural effect that helps prevent excessive loss of heat from the earth’s surface. Without that effect, the earth would have been a lot colder and might have been less habitable for humans, animals and plants. It has been postulated that the earth’s surface would have been about 33°C colder than it currently is [16], [17]. The human activities mentioned here are linked to human efforts towards industrialization. The objective of this write up therefore is to show that humans in the bid to become industrialized have as well adversely affected the environment exacerbating the climate change effects. [14] Industrialization and emissions heightened human activities have been shown to have led to increase in global temperatures causing climate change. In the past two centuries, industrialisation took a different turn towards the use of technique and the mechanization of processes which were erstwhile performed by hand. All of this new methods led to technological innovations in countries ,a different transformations of economies, territorial expansions, population growth and so on.

The grim reality of the relationship between industrialization and climate change is captured here in the statement by World Resources Institute quoted in [8] that, “...there is a huge contrast between developed/industrialized nations and poorer developing countries in greenhouse emissions, as well as the reasons for those emissions”. The effects of the emissions are not restricted to those nations which emit them and to the unindustrialized nations. These effects could be described in terms of opportunities and challenges. The opportunities cause by industrialization are well known as economic transformation which results to better amenities, improved standard of living; accumulation of capital and so on. The challenges include coping with higher temperatures, more extreme weather conditions, ecosystem impacts, rising sea levels, increasing ocean acidification, changing human lifestyles and changing philosophies.

Economic transformation involves the exploitation of natural resources. With industrialization as a rule comes urbanization. Industrialization widens the gaps in different classes of people in the society and leads to changes in lifestyles with mechanization when productivity boosts and incomes increase. Human behavior and social transformation lead to environmental change. According to the UN on population growth; the world population was put at 5.7 billion in 1995 and, is expected to double by 2050. It is projected that 95% of this population growth will be in the developing world. The overuse of natural resources is responsible for the pollution level today. The use of resources with little or no control is a serious and growing encroachment by humankind on the interacting systems of the earth’s atmosphere, hydrosphere and land surface [14]. Industrialization spells a higher level of pollution, uncontrolled exploitation and inability to link up between non-performance of social responsibilities to non-functionality of systems. Increased industrialization cannot be encouraged without considering the account of climate

change and its consequences. The United Nations has established a body -an Intergovernmental Panel on Climate Change (IPCC) comprising hundreds of scientists and researchers of climate change around the world to release main, definitive reports detailing the progress of impact of climate change on the Earth. They have made some recommendations based on their findings and deductions due to better scientific understanding. Their recommendations have been mainly in terms of mitigation of the effects and adaptation to the climate change. Now, there are mitigation activities being taken to reduce the net emissions of GHG and so decrease climate change effect. However, there is need for adaptation to the climate change. As a fact adaptation needs to be begun immediately so people can keep up with the predicted shifts in conditions. According to Morofsky [15], effective mitigation of and adaptation to the impacts of climate change require a common set of response priorities. Water and energy efficiency are of primary importance. Measures to assess risk and manage durability need to be developed and integrated into practice. Emergency preparedness and response programs need to be further improved. As a result, there is need to improve regulation standards of professional practice designed to protect the environment from increased weather hazards.

There are some aspects of reducing and adaptations that need to be assimilative to reduce the consequences of the climate change effects are [14], [15]: 1. Improvement of approach and practices for protecting and improving existing construction against effects of climate change. 2. Improvement of designs, operations and maintenance of buildings and machines. 3. Revise existing codes such as climate data to take into consideration the present realities. 4. Improve and adopt energy-saving technologies. 5. Adopt clean and renewable energy usage. 6. Reduce the use of natural resources; rather emphasize the use of industrial byproducts. 7. Reduce waste at the design stage. While industrialization is encouraged, it must seriously consider aspects of mitigation and adaptation to climate change.

CONCLUSIONS

According to [17] who put it concisely, “GHG are accumulating in Earth’s atmosphere as a result of human activities, causing surface air temperatures and sub-surface ocean temperatures to rise. Temperatures are, in fact, rising. The changes observed over the last several decades are likely mostly due to human activities, but we cannot rule out that some significant part of these changes is also a reflection of natural variability.” Climate change resulting from the enhanced GHG effect due to intensified industrialization has been presented to have widespread consequences, causing: sea-level rise; melting of glaciers and sea ice; changes in rainfall patterns with implications for floods and droughts; and changes in the incidence of climatic extremes, especially high-temperature extremes. These effects of climate change have been shown to have impacts on ecosystems, health and such economic sectors as agriculture. It has been shown by the IPCC reports that all industrialized nations have emitted far more GHG emissions although some developing nations are also increasing their attempts to industrialization. As it has been proven by the IPCC reports, the emissions from rich countries that accumulated in the atmosphere for so long to trigger climate change. Despite the

more than 15 annual international conferences on climate change as United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) so far, there has still been little progress on reducing emissions. The situation in the world the same. The industrialized nations, who are actually the main polluters (at the COP17—Warsaw Climate Conference held in Warsaw, Poland in 2017), managed to reduce their commitment to reduction of emissions while increasing those of the developing countries. The natural carbon cycle and human-induced climate change differ in that the latter is rapid. This means that ecosystems have less chance of adapting to the changes that will result and so the effects felt will be worse and more dramatic if things continue the way they are now. Therefore, more commitment is required from the industrialized nations towards the reduction of emissions. Plans towards industrialization should be more articulate and broadly think of its consequences both in the present and in the future. Environmental impact assessment should be a key part in every plan towards industrialization. Companies and industries should not push back on environmental programs in order to increase profits or to survive in a tough business world. Environmental maintenance agencies should be more focused on the main goal of restoring and keeping the environment in a state fit for human habitation. Anthropogenic climate change is faster than the natural process of restoring nature. The consequences will be more dramatic if everything continues as it is now. The only sure way is to make more commitments to reduce emissions by the industrialized countries of the world. Industrialization plans should be clearer and generally take into account its effects both now and in the future. When developing plans of industrialization of the industrialized countries, the issue of assessing the level of impact on the environment must be key. Environmental institutions should pay more attention to the main objective of restoring and maintaining the environment in a condition suitable for future generations.

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