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Evolution of policy for restructuring economies of old industrial regions: from determinism to anti-crisis flexibility

Abstract: This article analyses the evolution of policy for restructuring old industrial regions based on the European experience and understanding of the building factors of modern EU industrial policy. It outlines the stages of this evolution and their characteristics, associating them with the search for reserves for growth in old industrial regions facing changes in development factors. The drivers that change economic development factors (namely, globalisation trends, declining economic returns on innovations, widening scope of challenges that require faster reactions, and new technological capacity to implement green technologies in industry) are identified as triggers that change the approaches, mechanisms, and methods of structural renovation in these regions, necessitating a correction to industrial policy. The study finds that industrial policy renovation is objectively necessary to ensure effectiveness and that it occurs continuously due to permanent endogenous changes. The fast adaptation of industrial sectors is needed due to an increase in the number of challenges and acceleration of endogenous changes ensured by the anti-crisis flexibility of the policy, which forms the basis of regional systems' adaptivity to crisis conditions. The author highlights decarbonisation and the just transition framework for a post-carbon society as the determinative trends of industrial development. Recommendations are suggested for the anti-crisis correction of Ukrainian coal sector reform and revision of behaviour strategies of coal industries in old industrial regions facing the 2022 energy crisis.

Keywords: anti-crisis flexibility; energy crisis; just transition; old industrial regions; restructuring

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INTRODUCTION

Changes in the global political situation and subsequent shifts in social and economic development have a significant influence on the behaviour of certain sectors of the economy, particularly industry. In such circumstances, there is a need to strengthen

industrial policy to ensure its adaptability and strategic orientation to guarantee the resilience of the entire economic system of the country. This requires the development of a flexible industrial policy that can adapt to challenges and quickly accommodate industrial sectors' behaviour during crisis conditions without compromising their strategic guidelines for development.

This article represents the results of a study conducted as part of the National Academy of Sciences of Ukraine's research project on "Strategic Planning of Industrial Development in the Conditions of Global Instability." The *subject of the study* is the evolution of policies for restructuring the economies of old-industrial regions (OIRs) in the circumstances of the 2022 energy crisis, which was provoked by Russia's military aggression in Ukraine. The *goal of the article* is to provide recommendations for ensuring the anti-crisis flexibility of policies in the field of restructuring OIRs based on the principles of a just transition and the revision of the coal sector's behaviour strategies in these regions.

The article comprises an analysis of practical experience in developing and correcting industrial policy in response to exogenous crisis-generated changes. The study used various research methods of cognition: *the complex method* to recover the structural and functional chains between elements of industrial policy in the field of the restructuring OIRs' economies, *the method of generalisation* to determine basic trends of industrial policy formation, *the informational method* to assess strategic documents in the field of industrial development, *the deduction* to reveal general regularities of industrial policy formation; *the concretisation* to elaborate on specific features of industrial policy implementation in OIRs, and *the formalisation* to develop recommendations for correcting the structural transformation of OIR economies in crises.

To determine the stages of the evolution of restructuring policy for OIRs, the study identified drivers that changed the factors of economic development and were distinguished, serving as the gnoseological principle of determination. These drivers acted as triggers, necessitating changes in the approaches, mechanisms, and methods of structural renovation of these regions and requiring corresponding changes in industrial policy.

THE STAGES OF THE EVOLUTION OF ECONOMIC TRANSFORMATION POLICY IN OLD-INDUSTRIAL REGIONS

In the context of long-term global trends of declining coal extraction and the gradual shift away from fossil fuel-based economies, the restructuring of the coal industry is one of the fundamental requirements for achieving structural changes in the economies of OIRs. This issue is particularly relevant for regions where the coal industry is prevalent in the economic structure, as it requires overcoming negative social and environmental consequences of the structural changes, while also creating sources for endogenous growth.

The experience of the EU demonstrates that the structural changes of the economies of coal regions should be based on the general principles of the EU's regional policy, which aims to solve the problems of OIRs, as well as the provisions of the EU's industrial policy, which aims to promote sectorial transformations. However, determining the direction of OIRs' transition to a new type of industrial development requires an understanding of the post-industrial society, which has evolved over time and involves different stages of structural transformations (Snigova, 2020).

In the *first stage*, transformation policy is associated with searching for development reserves in OIRs facing changes in the factors of industrial development to post-industrial ones and the contraction of traditional industries. The emergence of post-industrial society has been linked with the need to shift the priorities of social development from material industrial production to services, and the growing importance of services in economic development.

The *second stage* of structural transformation policy for OIRs is associated with the search for and implementation of innovations in industrial activity. The post-industrial society has been viewed as an extension of technogenic development that does not require a break from traditional values and is based on hi-tech implementation in industry and services. The characteristic features of this stage are the orientation of industrial policy towards the traditional sectoral approach, increasing environmental problems associated with industrial activity, low energy efficiency in industry, and insufficient involvement of innovative knowledge in industrial activity (Snigova, 2020).

Clearly, the constant changes in the factors of economic development necessitate the modernisation of industrial policy to make the transformation process of the economies of OIRs economy a permanent and determined one. Implementing this approach ensures that industrial development in these regions corresponds and is adequate to modern conditions and threats, as well as to the challenges of the future.

In the *third stage*, the growth of globalisation trends and changes in the principles of the allocation of productive forces in regions lead to the orientation of industrial strategies towards findings ways and mechanisms to compensate for the deficit of regional resources in order to ensure industrial and regional development. Smart specialisation, based on the combination of regional, innovation, and industrial policies, was the tool used to target the prospective competitiveness of regional industrial systems in industrial policy (Snihova, 2018). Thus, the modern industrial policy of the EU is being developed with the consideration of the most important global trends until 2030:

- an ageing population and growing social inequality;
- transfer of heavy industry centres to Asian countries, threatening the growth of sustainable development;
- strengthening interrelation between climate change and the use of certain energy types;
- growing competition for resources;
- increasing global instability (Światowe tendencje..., 2017).

Over the last two years, the scope of trends requiring very rapid reactions from the industrial sector has widened. In addition to the trends mentioned above, new ones born or strengthened by the COVID-19 pandemic have emerged. The pandemic caused a particularly fast and large-scale contraction of demand and prices for all kinds of fossil fuels. A significant slump in economic growth resulted from the unforeseen contraction of traditional economic activity and changes in behaviour among both consumers and producers. The implementation of pandemic restrictions caused logistical complications and increased transportation costs. However, at the same time, the recovery has presented certain opportunities for national producers with powerful industrial potential (Zioło, 2022).

The *fourth stage* in the evolution of OIR restructuring policy is associated with the transformations brought about by the technological revolution and increasing problems arising from its implementation in industrial activity. The COVID-19 pandemic has

accelerated technological progress and favoured Industry 4.0 development (an increased involvement of robots and autonomous production systems based on the principles of compatibility and standardisation). This has caused the emergence of the Fifth Industrial Revolution (Society 5.0/Industry 5.0), with a growing demand for employee qualifications and, simultaneously, employers concentrating on the needs of their employees (Zdun, 2022).

These significant challenges across all industrial sectors have necessitated the acceleration of industrial policy adaptation to changing circumstances, with the above-mentioned trends being reflected in the renewed industrial policy of the EU. This policy, designed in response to the new challenges, is strategically oriented towards ensuring resilience in the face of economic turbulence and strengthening the competitive positions of industrial companies by promoting their flexibility and individuality (A New Industrial..., 2020).

The new industrial policy complements the traditional sectorial approach with a vertical one. The development axis of a post-COVID world has been determined, which should be reflected across all industrial sectors to ensure their prospective competitiveness. These axes include:

- *digitalisation of production processes*, requiring fundamental changes in the approaches towards communications and human capital management;
- *green transition*, outlining the need to reduce energy intensity and implement environmental limitations in industrial processes;
- *security and localisation*, which entails meeting the production needs of raw materials and communities, localising production activities to shorten the supply chains;
- *cybersecurity and technological security*, which are associated with access to technologies necessary for production and R&D;
- *society of high competencies*, where human capital formation is the basic requirement for technological development based on the integration of human capabilities, physical capacities, and machines.

The New Industrial Strategy, actualised in March 2021, has demonstrated the efficiency of implementing these vertical and horizontal approaches amid conditions of increasing global instability and economic unpredictability (Updating the..., 2021).

However, the trend of **decarbonisation** remains the most significant, directly influencing modern industrial policy and the restructuring of territories where the coal industry predominates. Energy transformation leads to a systematic contraction in coal extraction and the need for associated services. The industrial development of coal territories now depends on substituting coal with alternative energy sources, re-skilling personnel, attracting investments, and diversifying the economy.

Thus, the emergence of technological capabilities to implement the environmentally-friendly energy technologies has driven the **fifth stage** of the policy for the structural reconstruction of OIRs, associated with the transition to a post-carbon society. The key characteristic features of this stage that should be considered in the strategies are the decarbonisation of industry and a shift in the emphasis of industrial policy from purely economic to socially responsible goals.

This has become one of the principal reasons behind the skyrocketing interest in the idea of a just transition, which aims to find ways and instruments that, on the one hand, support more efficient actions for protecting the environment, and on the other, enable an economically consistent and socially just transition process to a post-carbon society.

Since 2015, the importance of the just transition framework, as mentioned in the global and European climate documents, has been constantly growing. A just transition has been defined as a development model directed at creating the conditions for a decent life for employees and communities that are subject to the influence of government climate and environmental policies (Porozumienie paryskie..., 2015; Silesia Declaration..., 2018).

Research and expert literature sources in the just transition sphere are also rapidly developing. A majority of researchers consider a just transition through the concentration on two elements: environmental policy and overcoming the negative consequences of this policy for society (Evans, 2007). McCauley and Heffron (2018) define a just transition as a fair and just process of transitioning to a post-carbon society based on the integration of environmental, climate, and energy policies.

Some researchers stress the importance of just transition issues for local communities that are directly affected by decarbonisation-related transformations. In this context, just transition is treated as a far-reaching reorientation of approaches to regional development and the formation of policies concerning the territories in transition, which is based on just access to various resources and complex social, economic, and environmental changes (Mustata, 2017).

Summarising the practices of carbon-dependent regions' transition to carbon neutrality, just transition can be seen as the process of changing the economy from high-carbon to carbon-free, with a special emphasis on the creation of conditions for decent work, quality of life, and well-being for the local population from the perspective of continuous employment and the quality of the environment where they live. Local policy is considered an approach to solving the unique problems of regions in the context of sustainable development, while just transition is considered to create new incentive mechanisms for structural transformations using the reserves of the local economy. The transformation consists of creating alternative sectors of the economy, and the contraction of investments into fossil fuels during this period should be consistent and not outpace the capacity to implement environmentally friendly energy technologies (Sprawiedliwa Transformacja..., 2018).

Taking into account the high community interest in ensuring a post-carbon transition of the economy, the relevance of studying the theoretical and practical findings in this area will continue to grow over time.

THE MODERN DETERMINANTS OF TRANSFORMATION IN REGIONS WITH PREVALENT COAL INDUSTRIES

In recent times, against the background of the strengthening European trends towards decarbonisation of the economy and addressing climate change, the EU's policy on the restructuring of old industrial – and in particular coal – regions has gained a new impetus. The renovation of approaches began in 2015 with the publication of recommendations concerning a just transition towards environmentally sustainable economies and societies (Guidelines for..., 2015).

With the adoption of this document, the EU's policy towards old industrial coal regions has gained a new meaning, shifting its goals from solely economic to also being socially responsible. In practice, this is achieved through a transition from simple economically effective structural transformation, which relies on the restructuring of traditional industries, to sustainable development based on comprehensive structural changes

in the economy. This has influenced trends in the coal industry as well as in regions with a prevailing coal industry, taking into account the need for a just transition of the energy sector. Just transition encompasses the economic structure, labour market, and social policy mechanisms.

To support the practical realisation of the idea of a just transition in the EU, the “Coal Regions in Transition” platform has been established. The goal of the platform is to provide assistance to coal regions that are suffering from the sector’s decline or subject to structural transformation to ensure the manageability of coal sector restructuring and prevent/overcome the negative socio-economic effects of the process. The platform is designed to promote of development and implementation of specific measures for coal regions aimed at creating their competitive advantages on a neo-industrial basis, particularly in the energy sector. Currently, 18 EU regions participate in the activities of the platform. The regions officially joined the pilots in 2019, seeing the opportunity to access transformation funds in the EU initiative (Platforma na...).

In 2020, the World Bank initiated support for pilot projects within the scope of the Initiative for Coal Regions in Transition in the Western Balkans and Ukraine, and the European Commission invited coal regions in Ukraine to participate in the programme for an accelerated transition to clean energy based on the just transition framework (Coal regions..., 2021). In Ukraine, energy sector policy has also changed in accordance with global trends, giving priority to increasing energy efficiency and using energy from renewable sources, while reducing the use of fossil fuels. The Energy Strategy of Ukraine for the period up to 2035, adopted in 2017, outlines the strategic guidelines for fuel and energy sector development, where reforms of the coal sector are determined as the key priority. However, the document does not mention the need to involve just transition mechanisms (Energy Strategy..., 2017).

According to the plan for coal industry reforms, the complex actions to mitigate the social consequences of coal industry restructuring will be undertaken in close connection with the programmes for social reconversion of regions with closing/conserved coal mines (Snihova, 2019). Following the best European practices, these programmes will include severance pay, consultive assistance for displaced personnel, professional training and retraining, organising public works for infrastructure recovery, creating new jobs, consulting and financial support for entrepreneurial initiatives, creating business incubators, and temporarily implementing special economic activity regimes in the regions where the coal mines are being closed.

FLEXIBILITY OF POLICIES OF EU COUNTRIES FACING THE ENERGY MARKET CRISIS CAUSED BY RUSSIAN AGGRESSION AGAINST UKRAINE

The widescale aggression of Russia against Ukraine has altered trends in the global, and in particular the European, energy market. These changes are associated with the growing prices for energy goods and demand for coal, driven by efforts to ensure the energy security of EU countries. At the same time, the urgency of transitioning clean energy and achieving EU climate goals has become more acute, leading to an acceleration of reforms and investments in the energy sector at both pan-European and national levels. Thus, in May 2022, the European Parliament adopted plans to strengthen EU energy resilience with the REPowerEU initiative (RE-Power EU..., 2022).

The REPowerEU plan should envisage the structural transformations of the EU energy system in order to overcome energy deficits through indirect measures. This requires:

- *Reduction of dependence on fossil fuels* through (1) transforming industrial processes to change from gas, oil, and coal to renewable energy and hydrogen; (2) developing external supplies of technologies and innovative solutions to create and evolve the capacities of clean energy production and implementation in industrial processes; (3) accelerating the provision licenses of licenses and implementation of innovations in the renewable energy sector, providing the REPowerEU plan with a full-scale regulatory environment and the personnel of appropriate qualifications; and (4) reducing fossil fuel use in complex-to-change industrial and transport sectors through energy efficiency, fuel substitution, electrification, use of renewable hydrogen, biogas, and biomethane.
- *The accelerated development of the renewable energy sector through* (1) accelerating the use of renewable energy (solar, wind, heat pumps, industrial heat) and implementing hydrogen energy – working on industrial standards, diversifying the hydrogen infrastructure; and (2) expanding the use of biomethane –integrating it into the EU domestic gas market, promoting production, implementing transportation infrastructure, and implementing R&D.
- *Strengthening energy saving and ensuring energy efficiency* requires a two-pronged approach. Firstly, structural changes need to be enforced in the energy and industrial sectors via medium- and long-term actions. Secondly, consumers' behaviour regarding energy saving needs to be changed. Regions and cities have been identified as leading performers in the development and realisation of measures for energy saving and energy efficiency, taking into account local conditions.

The plan also recognises the need and opportunity to change the behaviour strategy of the extractive industry, particularly the coal sector, in crisis conditions by correcting the process of just energy transformation – by prolonging the terms of exploitation of coal mines and domestic gas resources. This demonstrates the significant flexibility of EU industrial policy. However, the coal industry is structurally inert and has been slow to react to the challenges of the current crisis. Experts attribute this not only to mining and geological factors but also to factors related to a just transition in these regions, such as insufficient investment in the coal industry, employment reduction, and inadequate exploration of deposits (Mocno rośnie..., 2022).

STATE OF THE PROBLEM IN UKRAINE

The development of the conceptual basis for a state policy aimed at a just transition of the Ukrainian coal industry until 2030 is a positive step in initiating the process of green energy transformation and ensuring the quality of coal industry reform. The policy has been developed to address potential problems that may emerge in the economic, social, residential, and environmental spheres of the regions affected by coal industry reforms, including the possible negative impact resulting from the initiation of Ukrainian energy sector reforms, particularly in the coal industry (The Concept..., 2021).

In 2021, a five-year pilot project for transforming coal regions was established in Ukraine with the aim of producing a methodology that could be applied to other regions of the country. Initially, pilot projects were planned in Myrnohrad (Donetsk region) and Chervonohrad (Lviv region), followed by Novovolynsk (Volyn region), Lysychansk,

Hirsk (Luhansk region), Toretsk, Dobropillia (Donetsk region). In mid-February 2022, the projects were presented as part of the Strategy for Transformation of Coal Local Communities in the Donetsk region, along with the Action Plan of the Strategy for Transformation of the Coal Local Communities in the Donetsk region (Pokrovsk, Myrnohrad, Dobropillia, Novohrodivka, Selydove, Vuhledar, Toretsk) for the period of 2022–2024 (Notice of..., 2021).

The strategy highlights several main directions for the coal local communities' transformation, including the creation of a new model of economic development that is oriented towards innovative and green circular economies of local communities. This involves expanding the value added of end products in agriculture and agri-product processing, creating a system that supports clusters and productive cooperation, and developing attractive touristic infrastructure and new services for tourists.

Another important direction is the use of renewable energy sources and ensuring energy efficiency. This involves implementing ready solutions in the sphere of renewable energy production and energy efficiency into the activity of communal and private property, with the aim of achieving sustainable development in local communities. However, the process has been suspended due to the Donetsk region being directly affected by Russia's ongoing military invasion of Ukraine.

At the end of 2022, work intensified in forming the directions of a just transition for local communities in the Chervonohrad district. The project ideas, developed by the Working Group for the Just Transition Plan, touch on the creation of an industrial park and logistical hub, implementation of investment projects for the creation of a waste treatment plant and development of alternative energy production, renovation of vocational training and establishment of a transformation centre, a coal mine museum, and improvement of touristic infrastructure as main drivers of economic growth in the region (The Working..., 2022).

These contributions are crucial for the realisation of the plans for a just transition in coal regions and for Ukraine's fulfilment of its duties regarding the Green Deal in the future. The *Action Plan for a Just Transition* is a package of projects that could be realised in the local community in the context of potential coal mine closures and the social and energy challenges of the 2022 global energy crisis associated with Russia's full-scale intervention in Ukraine. This crisis also highlights the growing need for coal to ensure Ukraine's energy independence, either during times of crisis or during the transition period of post-war economic reconstruction.

Despite the need to focus on green energy production during post-war economic reconstruction in Ukraine and continue with reforms in the coal sector in line with the goals set out in the energy strategy, there is a need to adjust the current transformation processes in the coal sector to implement anti-crisis measures. The importance and necessity of this direction have been emphasised by the EU's anti-crisis measures. Therefore, the situation requires:

- anti-crisis adjustments to plans and corrections to the stages and timeline of coal sector reforms as outlined in Ukraine's energy strategy;
- development of a comprehensive set of industrial restructuring measures that take into account the expected growth in demand for coal during the reconstruction period;

- modification to the just transition process for coal regions, taking into account the sector's inertia and behaviour during crisis conditions, and extending the service life of coal mines.

CONCLUSIONS

The long history of problems related to restructuring and adapting OIR economies has allowed for the evolution of the policy to be studied, with stages identified and the characteristics and factors of economic development requiring the correction of industrial policy determined.

The change in the stages of the evolution of EIR restructuring policy is associated with a gradual change in the efficiency factors of economic development of regions facing endogenous changes and is conditioned by growing trends of globalisation, declining economic returns on innovations implemented, widening scope of challenges requiring permanent acceleration of reactions, and emerging technological capacity to implement environmentally friendly energy technologies, among other factors. Each stage of policy formation is related to the search for the reserves of growth of OIR economies based on updating the development factors that arise from changes in the institutional framework of the economy resulting from the previous stages.

The upgrade of industrial and restructuring policies for OIRs facing permanent and rapid endogenous changes is a necessary requirement for ensuring their effectiveness, and it is a continuous process determined by the causal relationships between changes in development factors and the essential characteristics of the policies. Moreover, the stages of evolution have witnessed the widening of the scope of challenges and an acceleration of endogenous changes, necessitating faster adaptation of industrial sectors to crisis conditions such as the COVID-19 pandemic and the 2022 energy crisis. This has led to the emergence and evolution of anti-crisis flexibility as the backbone of regional systems' adaptiveness, which is based on the adaptive correction of intermediate tasks and the ways to realise strategic goals as well as a reorientation towards alternative scenarios of development and corrective measures without changing the target orientation.

The policy of restructuring OIRs, especially in territories with a prevalent coal industry, has been formulated as part of strategic documents in the sphere of industrial and regional development. The main modern trend is the decarbonisation of industrial activity, which has a long-term and definitive influence on it. The basic mechanism of implementation is the just transition principle, which involves structural changes to all regional socio-economic processes, based on green innovations.

Changes in the global energy market trends under the influence of Russia's aggression against Ukraine have led to the EU industrial policy's increased flexibility through the development of an action plan to ensure the EU's energy resilience. The plan includes the need to extend the terms of service of existing coal mines and to modify the behaviour strategy of the coal industry in crisis conditions by correcting the just energy transition process.

In Ukraine, which also is in the process of a just transition of coal regions, there is a strong need for anti-crisis correction of strategic documents related to the restructuring of OIR economies, but this has not been realised. This shortcoming can be overcome by strengthening the interaction between the EU and Ukraine in the just transition sphere through the implementation of pilot projects for technological testing and practice of new

technological solutions in the energy sphere, specifically in renewable energy production, environmental innovations, and coal technologies.

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