Sustainable and innovative industrial development of EAEU countries

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Abstract. The UN sustainable development goals for the period up to 2030 are among the priorities for implementation in the Eurasian space. The introduction of the achievements of the fourth industrial revolution in the production processes in the Eurasian Economic Union can contribute to the implementation of the SDGs. Since industrial cooperation is a key driver of the development of integration processes in the EAEU, the transition to "green" industry can also contribute to the deepening of integration processes and improve the global competitiveness of goods produced in the Union. The purpose of this study is to analyze the state of the manufacturing industry of the EAEU countries in the context of achieving sustainable and innovative development. The study uses descriptive, comparative, and qualitative methods of analysis. The authors used a comprehensive approach to address issues relating to sustainable and innovative development of the manufacturing industry and their impact on the development of integration processes in the EAEU, which have not yet received extensive coverage in the scientific literature.

Keywords: Eurasian Economic Union · Green economy · Innovation · Industrial competitiveness · Sustainable development · Digitalization · Economic integration.

1. Introduction

The UN 2030 Agenda for Sustainable Development was adopted at the 70th session of the UN General Assembly on September 25, 2015. It includes 17 goals and 169 objectives in the field of sustainable development, which are of an integrated nature and balance the three components of sustainable development: economic, social, and environmental.

The goals and areas of economic development of the EAEU countries largely correspond to the goals and objectives of the Agenda. The goals of balanced industrial development are enshrined in SDG-9, "Building resilient infrastructure, promoting inclusive and sustainable industrialization and innovation" (Sustainable development goals, 2015). The increase of global competitiveness of the integration association and sustainable economic development at the regional level is worth mentioning among the strategic objectives of the digitalization of the Eurasian space (Digital Agenda …, 2017).

The issues of Eurasian integration, its peculiarities, contradictions, and problems are the object of numerous studies (Hartwell, 2013; Benešováa and Smutkaa, 2016). Contemporary researchers also make different judgments regarding the goals and motives for the creation of the EAEU, as well as the

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prospects for its development (Libman and Vinokurov, 2012) and Russia's role as the dominant member country, which stimulates and motivates other countries in the region to participate in integration processes (Hancock and Libman, 2016).

A 2017 study on the results of implementing green technologies in the production process shows that almost all developing countries have gained a competitive advantage through the creation of new green jobs (Altenburg and Assmann, 2017).

At the moment, the problem of sustainable, innovative and digital industrial development within the framework of integration associations, in particular the Eurasian Economic Union, has not been sufficiently developed by the scientific community. Nevertheless, some aspects have been reflected in previous publications of the authors (Kolomeytseva and Maksakova, 2019; Platonova and Maksakova, 2022), which is a certain groundwork and prerequisite for this study.

2. Materials and Methods

The purpose of the study is to analyze the state of the manufacturing industry of the EAEU countries in the context of achieving sustainable and innovative development. The main objectives of the study include the following:

- determination of the most competitive manufacturing industries of the EAEU countries;
- assessment of the progress of the EAEU countries in achieving sustainable development of the manufacturing industry;
- analysis of the influence of the digital factor on the development of the industry of the EAEU countries.

Descriptive and comparative methods of scientific research were used to answer the set tasks. To identify the conditions under which the digitalization of the economy and industry will contribute to the integration of the EAEU countries, a qualitative method of analysis was used in relation to the official documents of supranational regulation of the EAEU.

To conduct a comparative analysis of the changes of the considered indicators, the 2015-2020 period was defined as the timeframe of the study, which is the period from the entry into force of the Treaty on the Eurasian Economic Union consisting of 5 states (Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia). At the same time for such an indicator as the SDG-9 index the data for 2018 are considered, since there are no more relevant statistics.

The materials for the study were official documents, including those adopted within the EAEU, the results of scientific works of Russian and foreign authors, as well as analytical materials of international organizations (UN, UNIDO) and integration associations (EAEU).

3. Results

3.1. Analysis of the competitiveness of industries in the EAEU countries

The index of Revealed comparative advantage (RCA) was used to determine the international specialization of EAEU countries. It is calculated according to the following formula:

$$RCA = ((Xij / Xit) / (Xnj / Xnt)) / ((Xij / Xnj) / (Xit / Xnt)) \quad (1),$$

where X – exports,
i – the country under study,
j – commodity (or industry),
t – group of goods (or industries),
n – group of countries.

The RCA index reflects the comparative importance of a commodity (or industry) in the structure of a country's merchandise exports in comparison with its share in international trade (Balassa, 1965). A country has a comparative advantage at RCA>1.

Table 1 presents the results of the calculation of the index of identified comparative advantage of manufacturing industries of EAEU countries. The list includes industries with an RCA>1 index value in at least one of the Union states.

Table 1. Index of identified comparative advantages of individual manufacturing industries in the EAEU countries. *Source*: compiled from (UNIDO Industrial Analytics Platform, 2022).

Industrial production	Armenia	Belarus	Kazakhstan	Kyrgyzstan	Russia
Basic metals	3.3	0.7	2.5	9.3	2.7
Other non-metallic mineral products	0.6	1.8	0.3	1.8	0.5
Finished metal products, excluding machinery and equipment	0.1	1.3	0.1	0.1	0.3
Production of coke, refined petroleum products and nuclear fuel	0.0	3.5	2.2	0.5	4.9
Chemicals and chemical products	0.1	1.4	0.1	0.1	0.5
Foods and beverages	1.7	2.9	0.4	0.5	0.8
Tobacco products	1.7	0.1	0.6	2.2	0.8
Wood and cork products, excluding furniture, manufacture of straw and platting	0.0	7.3	0.2	0.2	3.0
Textiles and textile products	0.3	1.0	0.0	0.5	0.1
Clothing	3.5	0.5	0.0	0.6	0.1
Rubber and plastic products	0.2	1.3	0.1	0.4	0.3
Furniture	1.3	1.0	0.1	0.1	0.2

According to the classification of the United Nations Industrial Development Organization (UNIDO), there are three levels of technological intensity of production:

- Low tech industries;
- Mid tech industries;
- High tech industries.

The classification is based on the coefficient of technological intensity, which is the ratio of R&D costs to total output.

It was found that the largest share in the exports of EAEU countries falls on the products of mid tech industries (59.8% in 2020), which include mainly the processing of mineral resources (Fig.1).

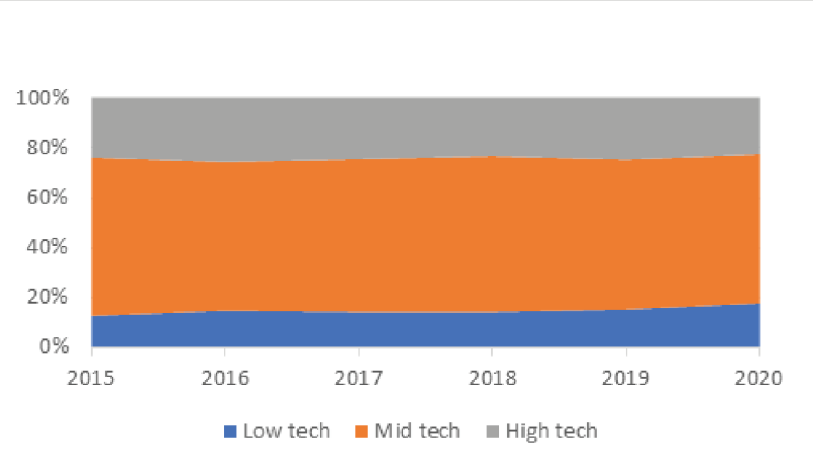

Fig. 1. Dynamics of technological intensity of industries in the EAEU countries. *Source:* compiled from (UNIDO Industrial Analytics Platform, 2022).

For comparison, 64% of exports in the European Union are the products of high tech industries, while mid tech industries account for only 16.1%. This data points to balanced trade relations between these integration unions.

3.2. Sustainable and digital industrial development in the EAEU

UNIDO was at the origin of the development of indicators in the field of sustainable development goals and has contributed significantly to the discussion and refinement of indicators, especially those directly related to sustainable industrial development. In particular, SDG-9 calls for "Building resilient infrastructure, promoting inclusive and sustainable industrialization and innovation" (Sustainable development goals, 2015).

UNIDO experts have developed a special tool to assess the progress of states towards achieving the Sustainable Development Goals related to industrial development. It is called the SDG-9 index and consists of five indicators related to the achievement of SDG-9 in the following main areas: Manufacturing value added (MVA), employment, carbon neutrality (CO2 efficiency), and technology.

The SDG-9 index can take values from 0 to 1, where 1 is the best result and 0 is the worst. The exception is the evaluation of such an index as carbon neutrality because the reduction of CO2, i.e., a score closes to 0 – is the preferred result.

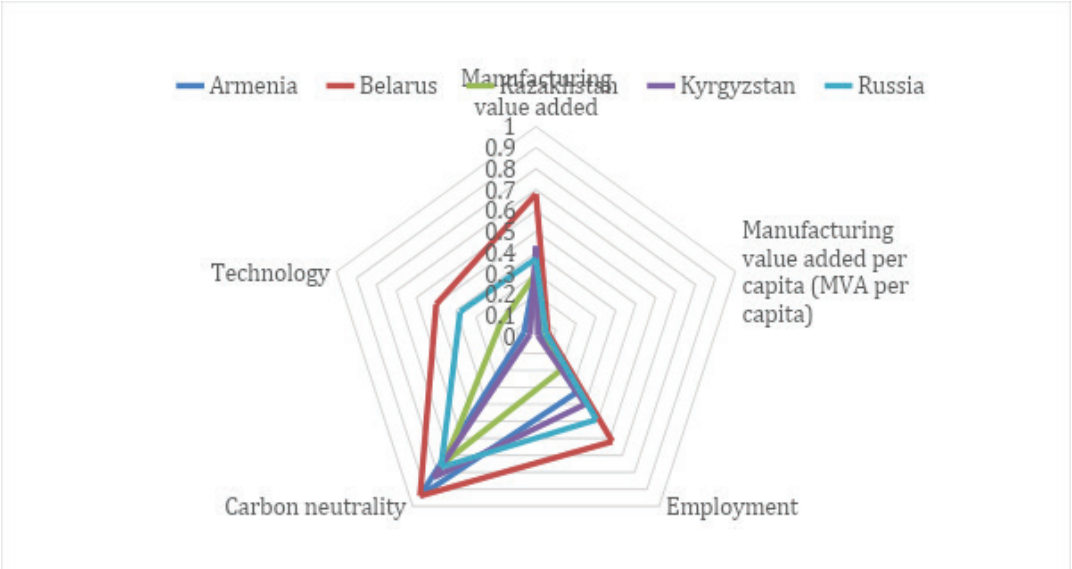

Fig. 2. Assessment of the SDG-9 index achievement of the EAEU countries. *Source:* compiled from (UNIDO Industrial Analytics Platform, 2022).

It was found that the EAEU countries differ significantly from each other in terms of progress with respect to the implementation of SDG-9 (Fig.2). At the same time, the countries of the Union achieved the greatest results in such areas as added value of the manufacturing industry and employment in industry, and the least – in the field of carbon neutrality, which is explained by the fact that the key manufacturing industries of EAEU countries are characterized by high emissions of pollutants into the atmosphere.

Among the strategic directions of development of the EAEU industry digital space are the following (Analysis of global experience, 2017):

- Breakthrough cross-industry digital transformation projects: creation of a digital platform for industrial enterprises, innovative companies and scientific organizations (based on the projects of the Eurasian technology transfer network and the Eurasian network of industrial cooperation and subcontracting);
- Cross-country projects of digital transformation: creation of a register of programs for electronic computers and databases; creation of a register of ICT equipment; formation of a catalog of projects to create testing sites for digital technologies;
- Projects with the creation of conditions for testing promising economic models for the use and development of digital space: ERP, SCM, MES; BIM; PLM, etc.; GIS (geographic information systems); digital platforms for the implementation of IIoT (industrial Internet of things); implementation of "Big Data" technologies, etc.

In the context of the digital transformation of industry, projects that form a digital ecosystem of industry, including smart factories, smart fields, etc., can be considered systemically important. Projects for digitalization of industrial production are already being implemented in the EAEU member countries.

4. Discussion

The problem of compatibility and association of sustainable and digital agendas in the framework of integration unions and in the context of industrial development of the Eurasian Economic Union has become one of the relevant topics of scientific discourse, especially at the present stage.

As a rule, researchers in their works focus on one of the current trends – either sustainability or digital transformation in relation to various aspects of economic development. Nevertheless, when assessing the impact of these processes on the EAEU industry, it is more appropriate to consider them simultaneously. This study largely complements and develops the works of the authors devoted to various aspects of the Eurasian Economic Union, including the issues of environmental friendliness and innovativeness of economic processes taking place in the union.

The use of the methodology and analytical tools of international organizations, UNIDO in particular, to assess the progress of countries towards sustainable industry allows a more comprehensive assessment of the impact and contribution of various factors to their further development. At the same time, the lack of relevant statistical data and indicators for recent years limits the analysis of changes of processes occurring in the Eurasian area.

5. Conclusion

A comparative analysis of the achievements of states in the field of sustainable industrial development has shown that the EAEU countries have not yet achieved significant results in this direction. At the supranational level, the first steps are being taken to implement the provisions of individual SDGs. In particular, in April 2022 the countries of the Union agreed on a regional list of indicators for achieving

the SDGs, which should become the basis for monitoring the SDGs in the EAEU countries (The Eurasian Economic Union …, 2022).

Among the manufacturing industries with identified comparative advantage, five industries were identified that differ significantly in their level of technology: 1) metallurgy – mid tech; 2) production of coke, refined petroleum products and nuclear fuel – mid tech; 3) production of basic chemicals and chemical products – high tech; 4) production of basic food and beverages – low tech; 5) production of basic wood products – low tech. Consequently, the EAEU countries need to increase the production of high tech industries, on the import of which they are seriously dependent.

The results of the assessment of the index of achievement of SDG-9 show that the progress of the EAEU countries in this direction varies significantly. This is partly because the countries of the Union differ greatly in the level of economic development. Belarus demonstrates the greatest success in the sustainable development of the manufacturing industry among all EAEU countries. Russia and Kazakhstan are significantly behind on such indicators as carbon neutrality and technology. Armenia and Kyrgyzstan show the weakest progress towards achieving SDG-9 in all five components of the index.

The digitalization of industry in the EAEU countries is developing in accordance with the regulatory documents adopted at the supranational level and is being implemented in practice in the form of specific projects of cross-industry and cross-country formats, which predetermines the need for further coordinated approaches during the digitalization of integration processes in the EAEU.

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