Editorial: Systemic vision of the transformations of international trade in global markets in the age of intellectual machines

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Abstract: This editorial presents a special issue on "Development of International Trade in Global Markets in the Age of Intellectual Machines" (V18), organised by the *International Journal of Trade and Global Markets* (IJTGM). This editorial describes deep transformations of global markets in the age of intellectual machines: (1) complication of the structure of global markets; (2) change in the character of competition and conditions of achieving competitiveness of economic subjects in global markets; (3) change in the tools of the management of global markets development. This editorial explains the logic of these transformations and systematises them. It reflects a new aspect of studying international trade in global markets – from positions of not only technological but also socioeconomic changes that take place in these markets in the age of intellectual machines, from the positions of which studies in the presented special issue were performed.

Keywords: international trade; global markets; age of intellectual machines; global competitiveness; pandemic; COVID-19 crisis; digital competition.

Biographical notes: Elena G. Popkova, Doctor of Economics, the Founder and President of the Institute of Scientific Communications (Volgograd, Russia), Professor of the Department of Economics, Chair of International Economic Relations at RUDN University, Moscow, Russia. She is author of more than 150 publications in Scopus (h-index: 36). She is Editor of more than 50 books and a large number of special issues of international peer-reviewed scientific journals. She is member of the Editorial Board of the *International Journal of Economic Policy in Emerging Economies* and the *International Journal for Quality Research*. She is recipient of Highly Commended Paper Award for the journal On the Horizon for 2020 (Emerald). She is honoured worker of science and high technologies of the Russian Federation. She is honoured Professor of Osh State University (Osh, Kyrgyzstan). She is among Scopus' top 2% of most-cited scholars of the world in 2019–2021.

1 Introduction

This special issue is devoted to the study of the problem of transformations of global markets in the age of intellectual machines, posed in the works of Dutta and Sarma (2022), Farahzadi and Kioumarsi (2023), Singh et al. (2023), and Tang et al. (2023). The

essence of this modern age is that automatisation based on intellectual machines – robots, big data, the Internet of Things, and artificial intelligence (including neural networks) – penetrates all spheres of economic activities (Hu et al., 2023; Ključnikov et al., 2023; Li et al., 2023; Muljono and Setiyawati, 2022; Popkova and Sergi, 2022; Popkova and Sergi, 2023a, 2023b).

In this special issue, the authors substantiated and scientifically explained deep transformations of global markets in the age of intellectual machines, which belong to the sphere of finance, marketing, labour organisation, and business risks. The studies cover the experience of various global markets in industry and agriculture, with particular attention to high-tech markets.

The uniqueness of this special issue is that it took into account – for the first time – the specifics of international trade in developed and developing countries and specified their positions in global markets in the age of intellectual machines. In addition to the context of digital competition, the special issue took into account the pandemic context and disclosed the unique experience of international trade in global markets in the age of intellectual machines in the conditions of the COVID-19 crisis.

2   Special issue overview

This special issue collected the best works presented at the 14th National Scientific and Practical Conference "A New Paradigm of Socio-Economic Development in the Age of Intellectual Machines", which was held in Russia in 2020. It systematised theoretical knowledge in the sphere of development of global markets in the age of intellectual machines. The general novel idea of the special issue is that in the age of intellectual machines, international trade in global markets acquires new technological and social features, which requires the application of novel organisational and managerial tools for the regulation of these markets. This idea was substantiated, disclosed, and developed in the special issue's papers.

Bobkov et al. compiled an econometric model that explains the regularities of the development of the production structure of robotised companies by the example of the Czech Republic. In their model, the scholars systematised the factors and described the growth of effectiveness of an automotive enterprise in the process of its organisational development. A new significant conclusion of this research is that automatisation based on industrial robots facilitates an increase in the Czech Republic's position in global car markets.

Osipov et al. opened a 'black box' of financing the development of network corporate structures for the strengthening of their positions in global markets in the age of intellectual machines. The developed financial model demonstrates a synergetic effect from the systemic application of the measures of state and corporate management. The novel conclusion of this paper is that the age of intellectual machines is a serious reason for unifying the efforts of state regulators and private companies in the sphere of financing innovations and high technologies, to strengthen the positions of domestic manufacturers in global markets.

An important contribution to the research sphere of this special issue was made by Arkhipov et al., who explained the essence and genesis of the age of intellectual machines and the logic of the formation of this age. Due to the use of the dialectical approach, the scholars specified the structural connections of economic systems as

complex and dynamic systems and proved the key role of technical and technological factors in the evolution of these systems. The scholars revealed deep contradictions of socioeconomic systems in the age of intellectual machines and proposed a conceptual basis for their overcoming through the reduction of entropy.

In continuation of the theoretical research on the scientific concept of the age of intellectual machines, Alekseev et al. rethought the essence and approach to labour division in global markets. Scholars proved that the implementation of intellectual machines allows raising the financial effectiveness of labour, which determines the expedience of diversification of the economy and total automatisation. Consideration of the specifics of developed and developing countries allows scholars to offer their recommendations for the growth of the activity of international trade of each category of countries, which will raise the aggregate effectiveness of the international division of labour in the age of intellectual machines.

Vanchukhina et al. proved in their paper that the COVID-19 pandemic and crisis negatively influenced the development of global markets and slowed down the evolution of intellectual machines. The authors presented the leading scientific and methodological developments, which allow for high-precision and comprehensive diagnostics of the financial and economic position of electric energy companies in the conditions of the COVID-19 crisis. The paper contributed to the development of the special issue's research sphere through substantiation of the key role of electric energy in the dissemination of intellectual machines, as well as through an explanation of the fact that due to the COVID-19 crisis international trade in global markets was largely determined by the accessibility of electric energy.

Yankovskaya et al. reconsidered the processes of the development of global markets of educational services given the digital context of the age of intellectual machines. The scholars determined the specifics of the development of international education and export of educational services in the age of intellectual machines, which consists in the reorientation of globally-oriented universities to the training of digital personnel and provision of engineering services in the sphere of machine learning. The authors developed and proved strategic approaches to an increase in the export of educational services and international education for developed and developing countries in the age of intellectual machines and proposed recommendations for the practical implementation of these approaches in the conditions of the COVID-19 pandemic and crisis.

Bodiako et al. proved that intellectual machines based on the technologies of big data and the Internet of Things play an important role in global high-tech markets. The authors clarified the financial barriers on the path of dissemination of big data and the Internet of Things, which are specific for developed and developing countries. The authors also offered their recommendations for the reduction of these barriers in support of the development of international trade in global high-tech markets in the age of intellectual machines.

In their turn, Fedotova et al. developed scientific and methodological recommendations on the use of neural network forecasting in dairy farming for the most complete development of the export potential of agricultural organisations in the age of intellectual machines.

Semenova et al. developed a marketing approach to the management of intellectual economic growth, which takes into account the specifics of developed and developing countries. The scientific novelty of this paper is a new view of intellectual economic growth in the knowledge economy based on the leading sectorial technologies 4.0 – from

the position of corporate and marketing management, not state regulation. The rather interesting conclusion of this paper is that in the age of intellectual machines, the reduction of global inequality implies an acceleration of the rate of intellectual economic growth of developing countries.

In the continuation of this, Sozinova et al. proved that intellectual economic growth in the knowledge economy is the basis for the development of international trade in the modern global markets. The authors offered a new treatment of the results of international trade in the modern global markets, which involves the consideration of international trade of goods, services, and capital. The scientific and practical value is posed by the authors' recommendations on the improvement of the management of intellectual economic growth in the knowledge economy for the development of international trade in modern global markets.

Gashenko et al. performed a detailed analysis of the international experience of implementing the tax policy of economic crisis management during the pandemic and came to the conclusion that the effectiveness of tax tools of anti-crisis management reduced during the COVID-19 pandemic. The scientific and practical value is posed by the authors' recommendations on the optimisation of the consequences of implementing tax tools for the Russian economy during the pandemic. These recommendations, in particular, ensure more effective use of the capabilities of automatisation based on intellectual machines in the practice of taxation.

Petrenko et al. presented an original scientific view of the digital future of international trade in global markets of intellectual resources. The scholars developed a promising methodology for assessing the effectiveness of international trade in global markets of intellectual resources. Approbation of the example of developed and developing countries allowed the scholars to prove that the prospect of an increase in the effectiveness of global markets of intellectual resources is connected with optimisation of the mobility of the workforce and automatisation based on smart technologies.

Savelyeva and Sozinova revealed a new vector of the development in the global trade of high technologies in the age of intellectual machines. This vector is the cross-border market of intellectual machines. The scholars studied the participation of countries with different levels of income in this market. The general recommendation of the authors for the development of a cross-border market of intellectual machines consists in the reorientation from state paternalism to corporate management based on the marketing activity of companies.

Fomenko et al. developed a risk-oriented approach to the organisation of international trade in intellectual resources. The authors proposed a new scientific classification of global markets of intellectual resources, in which they differentiated high-tech productions based on intellectual machines and medium-tech productions based on digital personnel. Depending on which intellectual resources dominate, the authors compile alternative scenarios of the organisation of the international trade in intellectual resources in global markets in the age of intellectual machines.

Reikhanova et al. improved the methodological support of the assessment of the effectiveness of the digital economy in the age of intellectual machines, specifying it from the position of economic growth. The new solution to the problem of an increase in the effectiveness of the digital economy in the age of intellectual machines is, according to the authors, the establishment of a balance of internal effectiveness and global competitiveness. The recommendation for the achievement of this balance in practice is

the comprehensive management of the development of high-tech productions and the growth of labour efficiency.

Vechkinzova et al. determined the technological and social limits of the participation of intellectual machines in socioeconomic relations in emerging economies. Due to the development and application of the proprietary methodology of multicriterial evaluation, the scholars specified the organisational model of international trade in global markets in the age of intellectual machines.

3   Conclusions

Generalising the results of the studies, gathered in this special issue, it is possible to conclude that in the age of intellectual machines in global markets, three key transformation processes take place. First, the structure of global markets becomes complicated. There emerge new global markets of intellectual resources, in particular, markets of digital personnel, markets of machine learning, and markets of intellectual machines (robots, the Internet of Things, artificial intelligence, etc.). There also emerge new global markets of products manufactured with the use of the leading means of automatisation based on intellectual machines.

Second, the character of competition and conditions of achievement of the economic subjects' competitiveness in global markets change. The use of intellectual machines not only raises the effectiveness (due to the growth of labour efficiency) but also increases the investment attractiveness and global competitiveness (due to the reputation of technological leaders) of the subjects of the digital economy. Third, the tools for managing the development of global markets change. New tools of state regulation and corporate management involve the automatisation based on intellectual machines, which raises their precision and effectiveness.

This special issue's contribution to the literature consists in the development of the scientific provisions of the theory of international trade in global markets through its rethinking in the special context of the age of intellectual machines. The theoretical significance of the special issue is due to its forming a theoretical and methodological basis and offering scientific recommendations for the strengthening of the positions of the digital economy subjects in global markets in the age of intellectual machines.

The practical significance of the special issue is due to the fact that its applied recommendations allow for the optimisation of the work of the mechanism of international division of labour and reduction of global inequality through a more active involvement of developing countries in global markets and increase in their potential of development of international trade in the age of intellectual machines.

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