

Elena G. Popkova  
Bruno S. Sergi *Editors*

# Scientific and Technical Revolution: Yesterday, Today and Tomorrow

# Lecture Notes in Networks and Systems

Volume 129

## Series Editor

Janusz Kacprzyk, Systems Research Institute, Polish Academy of Sciences,  
Warsaw, Poland

## Advisory Editors

Fernando Gomide, Department of Computer Engineering and Automation—DCA,  
School of Electrical and Computer Engineering—FEEC, University of Campinas—  
UNICAMP, São Paulo, Brazil

Okyay Kaynak, Department of Electrical and Electronic Engineering,  
Bogazici University, Istanbul, Turkey

Derong Liu, Department of Electrical and Computer Engineering, University  
of Illinois at Chicago, Chicago, USA; Institute of Automation, Chinese Academy  
of Sciences, Beijing, China

Witold Pedrycz, Department of Electrical and Computer Engineering,  
University of Alberta, Alberta, Canada, Systems Research Institute,  
Polish Academy of Sciences, Warsaw, Poland

Marios M. Polycarpou, Department of Electrical and Computer Engineering,  
KIOS Research Center for Intelligent Systems and Networks, University of Cyprus,  
Nicosia, Cyprus

Imre J. Rudas, Óbuda University, Budapest, Hungary

Jun Wang, Department of Computer Science, City University of Hong Kong,  
Kowloon, Hong Kong

The series “Lecture Notes in Networks and Systems” publishes the latest developments in Networks and Systems—quickly, informally and with high quality. Original research reported in proceedings and post-proceedings represents the core of LNNS.

Volumes published in LNNS embrace all aspects and subfields of, as well as new challenges in, Networks and Systems.

The series contains proceedings and edited volumes in systems and networks, spanning the areas of Cyber-Physical Systems, Autonomous Systems, Sensor Networks, Control Systems, Energy Systems, Automotive Systems, Biological Systems, Vehicular Networking and Connected Vehicles, Aerospace Systems, Automation, Manufacturing, Smart Grids, Nonlinear Systems, Power Systems, Robotics, Social Systems, Economic Systems and other. Of particular value to both the contributors and the readership are the short publication timeframe and the world-wide distribution and exposure which enable both a wide and rapid dissemination of research output.

The series covers the theory, applications, and perspectives on the state of the art and future developments relevant to systems and networks, decision making, control, complex processes and related areas, as embedded in the fields of interdisciplinary and applied sciences, engineering, computer science, physics, economics, social, and life sciences, as well as the paradigms and methodologies behind them.

**\*\* Indexing: The books of this series are submitted to ISI Proceedings, SCOPUS, Google Scholar and Springerlink \*\***


More information about this series at <http://www.springer.com/series/15179>

Elena G. Popkova · Bruno S. Sergi  
Editors

# Scientific and Technical Revolution: Yesterday, Today and Tomorrow

### *Editors*

Elena G. Popkova  
Moscow State Institute  
of International Relations  
Plekhanov Russian University  
of Economic  
Moscow, Russia

Bruno S. Sergi   
University of Messina  
Messina, Italy

Harvard University  
Cambridge, MA, USA

ISSN 2367-3370

ISSN 2367-3389 (electronic)

Lecture Notes in Networks and Systems

ISBN 978-3-030-47944-2

ISBN 978-3-030-47945-9 (eBook)

<https://doi.org/10.1007/978-3-030-47945-9>

© Springer Nature Switzerland AG 2020

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG  
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

# Introduction

The process of digital transformations is long and multistage, and its consequences are accumulative and multiplicative. The first digital technologies which appeared in the late twentieth century were accessible for a limited number of people; their advance laid a marketing foundation for the Fourth Industrial Revolution as a means of meeting the growing needs of the consumer society.

Subsequently, the mass distribution of simple (unintellectual) digital technologies—computer equipment, handheld devices, the Internet which eventually became high-speed and broadband—made it possible to form an advanced frame of mind with the representatives of great masses of population in the first decade of the twenty-first century.

This period was followed by a wave of the mass distribution of high technologies aimed at achieving high performance—intelligent assistance for making cut-and-dried solutions—and cyber security—cloud technologies and block chain technology (distributed ledger technology)—as well as at more extensive automation of certain business processes: production processes—by means of 3D printing, distributive processes—by means of RFID technologies, logistic processes—by means of SCM technologies, and communication processes—by means of CRM technologies.

At this stage which may be considered to be finished at the end of the second decade of the twenty-first century, there was a re-thinking of the role of engineering and technologies in people's lives, which came to the fore. To date, the openness of the popular majority of both developed and developing countries to high technologies, loyalty to them has been achieved; in addition, their great value and benefit for society and the economy have been acknowledged and recognized.

In 2020—at the beginning of the third decade of the twenty-first century—one may talk of the beginning of a new stage of the Fourth Industrial Revolution. It is expected that the impending stage will be associated with new outstanding scientific discoveries and technical inventions and will ensure the mass distribution of groundbreaking technology innovations of Industry 4.0. The transition to the Fourth Technological Mode will make it possible to form a “smart” economy in which

automation will reach the peak, and the boundaries between human and artificial intelligence may eventually be erased.

On the threshold of the impending new wave of the Fourth Industrial Revolution, critical analysis and system research of the future of mankind, as well as the development of recommendations for managing this future, constitute a topical issue of contemporary science. The consequences of the transition to Industry 4.0 are so unpredictable that they require that modern scientists not only have research abilities, but also creative thinking. The contours of the future are blurred: A technocratic society, which will be dominated by intelligent machines, may be formed, and a model of a social market economy based on social values and interests may be implemented in practice.

Therefore, the Fourth Industrial Revolution is a logical consequence of the scientific and technological progress in the twenty-first century. The relationship of the past, the present, and the future is absolutely clearly visible in it. This book is the result of a collective study of this process, its scientific reflection, and is reflective of a system view of its dynamics and future prospects, and also offers comprehensive recommendations on the organization and management for using the latest opportunities of the scientific and technological progress for the sake of mankind.

The book includes the most knowledge-intensive and creative papers which were reported and discussed at the 12th international scientific and practical conference, organized by the Institute of Scientific Communications. The conference “Artificial Intelligence: Anthropogenic Nature vs. Social Origin” took place during December 5–7, 2019, in Krasnoyarsk, Russia.

The target audience of the book consists of academic researchers and independent experts who study the social and human aspects of the Fourth Industrial Revolution and the associated transition to the digital economy and Industry 4.0, as well as the creators of the legal framework of this process and its participants—entrepreneurs, managers, employees and consumers.

The book has a logical structure and contains research findings in the following conceptual sections:

- “Intelligent” technologies and artificial Intelligence: promising directions of application in the present-day economy;
- Digital transformations of modern economic and social systems;
- Social environment of the Fourth Industrial Revolution and its consequences for mankind;
- Regulatory framework of the Fourth Industrial Revolution: experience and prospects;
- Effects of the Fourth Industrial Revolution on the environment: climatic change and “green” prospects of the digital economy;
- Financing of the Fourth Industrial Revolution and the prospects for improving the investment attractiveness of the digital economy.

## **Conference**

The conference was organized by the Institute of Scientific Communications (Volgograd) in cooperation with the Siberian Federal University (Krasnoyarsk) and the Krasnoyarsk regional fund for supporting scientific and technological activities (Krasnoyarsk).



# Contents

<b>“Intelligent” Technologies and Artificial Intelligence: Promising Directions of Application in Present-Day Economy</b>	
<b>Artificial Intelligence: Semiolinguistic and Communicative Competencies</b> . . . . .	3
Andrey V. Olyanitch, Marjet P. Akhidzhakova, Zaineta R. Khachmafova, Elchin A. Gashimov, and Bella N. Akhidzhak	
<b>Cybernetic Approach to the Modern Knowledge Economy</b> . . . . .	12
Gilyan V. Fedotova, Veronika S. Epinina, Tamara V. Stepanova, Evgeny N. Bardulin, and Ramzan V. Gipaev	
<b>The Comprehensive Development of Small Enterprises in the Russian Federation</b> . . . . .	22
S. N. Shchemelev and O. I. Abbasova	
<b>Analysis of the Features of Commodification in the Regions of Russia</b> . . . . .	30
Tatiana L. Melekhina and Victoria A. Pobedushkina	
<b>Forming Expertise Clusters in Spatial Accelerated Development Zones of the Region</b> . . . . .	40
Irina S. Baghdasarian, Natalia V. Raznova, Anastasia N. Rusina, and Irina V. Filimonenko	
<b>Innovative Aspect of Assessing the Competitiveness of Engineering Companies in the Nuclear Industry</b> . . . . .	49
Nikolay Y. Leontiev, Victor P. Kuznetsov, Alexey Y. Ivanov, Nadezhda D. Ivanova, and Aleksey A. Ivanov	
<b>Conceptual Bases of Company Competitiveness. Criticism and Development</b> . . . . .	58
Nikolay Ya. Leontiev, Anna F. Plekhanova, Aleksey A. Ivanov, Nadezhda D. Ivanova, and Kirill I. Kolesov	

<b>Structuring the Calculation Planning Function of the Enterprise . . . . .</b>	<b>65</b>
Igor E. Mizikovskiy, Elena V. Shpilevskaya, Tatyana O. Tolstykh, Maksim M. Kutepov, and Artyom A. Sirotkin	
<b>Potential for Household Development in the Depressed Regions of Russia . . . . .</b>	<b>74</b>
Olga A. Nikolaichuk, Nina M. Lizunova, and Larisa Yu. Obukhova	
<b>Science and Technic Revolution's Impact on the Economic Development of Germany in 16<sup>th</sup> – 19<sup>th</sup> Centuries . . . . .</b>	<b>83</b>
Roman Yu. Boldyrev, Slavyana Yu. Boldyreva, Asiyat A. Vakhabova, and Olga L. Tychina	
<b>The Intercultural Communications in the Global World: Methods and Tools for Building Relevant Models . . . . .</b>	<b>93</b>
Natalia A. Orekhovskaya, Tatiana N. Seregina, Elena I. Zamaraeva, and Dariya Yu. Kushnir	
<b>The Integrated Model for the Development of Entrepreneurial Potential in the Context of the Formation of a Corporate Entrepreneurial Environment . . . . .</b>	<b>103</b>
N. V. Ketko, N. N. Skiter, O. E. Akimova, V. V. Velikanov, and A. V. Kostikova	
<b>Complex Product Development in the Conditions of High-Tech Transformation of the Economic System . . . . .</b>	<b>113</b>
Natalia S. Andryashina, Ekaterina P. Garina, Elena V. Romanovskaya, Victor P. Kuznetsov, and Alexander P. Garin	
<b>Development of Industrial Production Through the Product Management Creation Systems . . . . .</b>	<b>122</b>
Ekaterina P. Garina, Elena V. Romanovskaya, Natalia S. Andryashina, Alexander P. Garin, and Svetlana N. Kuznetsova	
<b>Generalization of Methodological and Practical Approaches for Formation of Product Creation Systems at Industry Enterprises . . .</b>	<b>131</b>
Ekaterina P. Garina, Elena V. Romanovskaya, Natalia S. Andryashina, Victor P. Kuznetsov, and Yaroslav S. Potashnik	
<b>Transformation of Economic Systems Under the Conditions of Technical and Technological Complexity of Transformed Processes: Organizational and Management Decisions . . . . .</b>	<b>140</b>
Elena P. Kozlova, Ekaterina P. Garina, Elena V. Romanovskaya, Natalia S. Andryashina, and Anastasia O. Egorova	
<b>Management of the Development of Economic Systems in the Context of Their Technological Transformation . . . . .</b>	<b>150</b>
Victor P. Kuznetsov, Altynay S. Adzhikova, Marina S. Romanova, Elena P. Kozlova, and Evgeny A. Semakhin	

<b>Use of Letter of Credit Form of Payment in the Implementation of Smart Contracts and Blockchain Technology</b> . . . . .	160
Elena N. Agibalova, Igor B. Ilovaysky, Yanina Y. Kayl, and Viktoria A. Usanova	
<b>Blockchain Technology in Smart Contracts: Is It a Constitutive Attribute or a Technological Neutrality?</b> . . . . .	171
Elena N. Agibalova	
<b>Methodological Approaches to a Comprehensive Assessment of the Economic Efficiency in Using Innovative Technologies in Agriculture: A No-till Example</b> . . . . .	181
Natalia V. Bannikova, Alexander V. Tenishchev, Svetlana S. Vaytsekhovskaya, Natalya V. Vorobyova, and Elena G. Pupynina	
<b>Hotel Tech Ecosystem: Adaptations to Online Distribution</b> . . . . .	194
Natalia A. Zamyatina and Oksana G. Solntseva	
<b>Smart Contracts in the Russian Transaction Regulation</b> . . . . .	205
Elena B. Zavyalova, Ekaterina I. Shumskaia, and Mikhail D. Kuzmin	
<b>Artificial Intelligence and Its Impact on Economic Security: Trends, Estimates and Forecasts</b> . . . . .	213
Evgeniya K. Karpunina, Sergey V. Dedov, Marina V. Kholod, Sergey V. Ponomarev, and Elena A. Gorlova	
<b>Contemporary Trends in International Maritime Organization's Navigation Safety Activities</b> . . . . .	226
A. V. Grinevich and S. M. Kopylov	
<b>The Use of Information and Communication Technologies in the Practice of Special Education</b> . . . . .	233
Svetlana E. Uromova, Elena Y. Medvedeva, Elena E. Dmitrieva, Elena A. Olkhina, and Elena V. Zhulina	
<b>Cluster Model in Medicine, Healthcare and Pharmacy as a Platform for Public-Private Partnership</b> . . . . .	239
Ekaterina A. Pogrebinskaya, Galina A. Rybina, Valentina V. Kuznetsova, and Nadezhda P. Tishkina	
<b>Information Technology as a Tool for Learning Market Narrative</b> . . . .	249
Vladimir V. Skalkin, Sofia A. Sidorova, Vladimir V. Maltsev, and Violetta S. Tsarckova	
<b>Analysis of the Factors and Scenarios of Forming a New Direction in the 21<sup>st</sup> Century Energy – Intelligent Energy Networks (Smart Grid)</b> . . . . .	257
Pavel V. Trifonov, Maria A. Kirpicheva, and Astkhik A. Khachatryan	

<b>Methodology of Risk Management Assessment at an Industrial Enterprise</b> .....	265
Yaroslav S. Potashnik, Elena P. Kozlova, Svetlana N. Kuznetsova, Sergey D. Tsymbalov, and Elena A. Chelnokova	
<b>Improvement of Strategic Planning in the Forest Sector of the Economy (Regional Level of Analysis)</b> .....	272
Yana Y. Radyukova, Elena A. Kolesnichenko, Svetlana V. Zenchenko, Anna V. Savtsova, and Nikolay N. Pakhomov	
<b>The Process of Technological Re-equipment Planning of an Enterprise in a Complex Industrial Production</b> .....	280
Elena V. Romanovskaya, Ekaterina P. Garina, Natalia S. Andryashina, Svetlana N. Kuznetsova, and Alexander P. Garin	
<b>Product Creation System in the Conditions of High-Tech Transformation of the Economic System</b> .....	289
Elena V. Romanovskaya, Ekaterina P. Garina, Natalia S. Andryashina, Victor P. Kuznetsov, and Alexander P. Garin	
<b>Competence of AI: Measuring and Management</b> .....	296
Irina S. Bagdasarian	
<b>Artificial Intelligence and Its Role in the Development of Small and Medium Businesses</b> .....	303
Aliya M. Bazieva, Asylbu I. Ermatova, Aida S. Umuralieva, Gulbara N. Borubaeva, and Zairbek A. Osmonov	
<b>The Scientific and Methodological Approach to Studying the Social Nature of AI</b> .....	314
Evgeniy V. Krasnov, Alexander A. Bondarenko, Svetlana V. Ponomareva, and Roman P. Bulyga	
<b>The Choice of the Regularization Parameter for Solving Linear Volterra-Stieltjes Integral Equations of the Third Kind</b> .....	321
Nurgul Bedelova	
<b>The Model of Organization of “Green” Digital Production and Consumption Based on the Internet of Things and AI</b> .....	329
Gulzat K. Tashkulova and Elena V. Kletskova	
<b>Modernization of State Management of the Digital Economy Based on AI</b> .....	337
Tatiana M. Rogulenko, Alexander A. Turovsky, Anna V. Bodiako, and Yuri V. Sinyakov	
<b>Digital Workforce for the “Green” Economy “Smart” Enterprises: Training and Management Features</b> .....	345
Aida Ya. Tamakhina, Stepan I. Mezhev, and Sergey V. Yungblyudt	

## **Digital Transformations of Modern Economic and Social Systems**

<b>Relationship of Economic Communications and Productive Consumption: Theoretical Aspect . . . . .</b>	<b>357</b>
Svetlana L. Sazanova, Radim Valencyk, Bagrat A. Yernkryan, and Galina N. Ryazanova	
<b>Managing Company Competitiveness in the Digital Economy . . . . .</b>	<b>365</b>
Irina Yu. Sizova, Elena M. Semenova, Aleksandr V. Zakharov, Elena A. Sotnikova, and Yuliia A. Zviagintceva	
<b>Directions for Increasing the Budget Expenditures Efficiency Under the Digital Economy Conditions . . . . .</b>	<b>376</b>
S. N. Meliksetyan, G. V. Popova, A. L. Malyuga, and E. V. Kravchenko	
<b>The “Green” Scenario of Development of the Digital Economy: Strategic Priorities and Subjects of Management . . . . .</b>	<b>387</b>
Raisa T. Adarina, Ayapbek A. Kuttubaev, and Kseniya A. Melekhova	
<b>Digital Humanities: The Possibility of Using Intelligent Learning Systems in Teaching Foreign Languages . . . . .</b>	<b>395</b>
Ludmila V. Guseva, Elena V. Koroleva, Galina A. Kruchinina, Julia A. Marinina, and Anastasia A. Oladyshkina	
<b>Responsible Information Society as a Social Environment for Creation of the “Green” Digital Economy: Formation and Monitoring . . . . .</b>	<b>402</b>
Tamara G. Stroiteleva, Elena A. Petrova, and Sergey V. Yungblyudt	
<b>Ontogenesis of Green Development Model of Digital Economy: Essence, Stages, and Prospects . . . . .</b>	<b>410</b>
Tamara G. Stroiteleva, Elena V. Kletskova, and Svetlana I. Balaeva	
<b>The Possibility of Forming Systemic and Critical Thinking Skills of Students in the Digital Economy . . . . .</b>	<b>418</b>
Alexandra Kriulina and Tatiana Gudkova	
<b>Digitalization of the Russian Economy: Institutional Strategies, Factors and Problems . . . . .</b>	<b>427</b>
Marina Alpidovskaya and Ekaterina Stompeleva	
<b>The Role of Digital Technology in the Formation of Agri-Food Clusters . . . . .</b>	<b>435</b>
Olga Kusakina and Natalia Dovgotko	
<b>Legal Liberalism and the Digital Economy: Boundaries of Freedom in a New Era . . . . .</b>	<b>449</b>
Vladimir E. Berezko	

<b>Clustering and Development of Information and Telecommunication Technologies as Factors for Overcoming the Digital Divide of Regions</b> .....	459
Anna N. Zhilkina, Marina V. Gracheva, Marina B. Trachenko, Ol'ga D. Gaisha, and Vladimir A. Dzhioev	
<b>Digital Innovation Technologies in Public Governance: Budget Geolocation System</b> .....	467
Sergei G. Kamolov and Aleksandra A. Smagina	
<b>Towards Sustainable Development Through Bridging Digital Penetration Gaps</b> .....	476
Evgeniya K. Karpunina, Anna F. Beilina, Larisa M. Butova, Svetlana A. Trufanova, and Alexander S. Astakhin	
<b>Dialectics of Sustainable Development of Digital Economy Ecosystem</b> .....	486
Evgeniya K. Karpunina, Galina K. Lapushinskaya, Asya E. Arutyunova, Svetlana V. Lupacheva, and Alexander A. Dubovitski	
<b>The Ecosystem of the Digital Economy: A New Approach to the Study of Structural Features and Content</b> .....	497
Evgeniya K. Karpunina, Elena A. Okunkova, Ekaterina V. Sazanova, Natalia N. Gubernatorova, and Evgeniya S. Tishchenko	
<b>Improving the System of Regulation and Conduct of Banking Operations in the Era of Digitalization</b> .....	509
Alisa S. Kirizleyeva	
<b>Potential for Development of Business Segments of the Green Economy in the Republic of Crimea</b> .....	520
Olga V. Kozhevina, Natalia V. Salienko, Evgeny A. Starozhuk, Victoria A. Klueva, and Irina V. Pavlova	
<b>Digital Transformation of the Industrial Sector: Challenges and Prospects</b> .....	530
Olga V. Kozhevina, Natalia V. Salienko, Evgeny A. Starozhuk, Victoria A. Klueva, and Irina V. Pavlova	
<b>Labour Market in the Era of Digital Economy</b> .....	540
Olga A. Nikolaichuk, Nina M. Lizunova, and Larisa Yu. Obukhova	
<b>The Contract of Power Supply During the Era of the Digital Law: Civil Bases</b> .....	553
Oxana B. Novruzova, Yuliya O. Pronina, Elena A. Shergunova, and Evgenij D. Gorevoy	
<b>Problems of Digitalization: Using Information Technology in Business, Science and Education</b> .....	561
Irina A. Rumyantseva, Tatiana Yu. Krotenko, and Marina B. Zhernakova	

<b>Development of the Crowdfunding Financial Mechanism in the Framework of the Digital Economy</b> . . . . .	571
Ekaterina G. Sheina, Alexander V. Kurdyumov, and Andrei K. Izmodenov	
<b>Forecasting Method of Product Shipment</b> . . . . .	581
Michael N. Pavlenkov and Rinat Zh. Reimov	
<b>Institutional Environment of the Digital Economy</b> . . . . .	593
Svetlana L. Sazanova and Nikolay V. Kuznetsov	
<b>Creation of a Virtual Model of Educational Programs Management in a University</b> . . . . .	602
Elvira K. Samerkhanova, Pavel A. Ruzanov, Elena P. Krupoderova, Klimentina R. Krupoderova, and Alexander V. Ponachugin	
<b>Designing Digital Learning Environment for the Future Teacher of High School</b> . . . . .	610
Elvira K. Samerkhanova, Elena P. Krupoderova, Klimentina R. Krupoderova, Lyudmila N. Bakhtiyarova, and Alexander V. Ponachugin	
<b>Digital Economy and Sustainable Development of Northern Traditional Industries in the Paradigm of Ethnological Expertise</b> . . . . .	619
Irina V. Samsonova, Matrena S. Malysheva, Maria B. Pavlova, and Lyubov A. Semenova	
<b>Formation of the Digital Economy Through Essence, Genesis and Technology</b> . . . . .	625
Elena A. Zbinyakova, Oleg V. Sizov, Nataliya V. Pyanova, Liliya M. Marchenkova, and Elena M. Samorodova	
<b>Museum in a Single Digital Space</b> . . . . .	637
Elena B. Ivushkina, Elena V. Dashkova, Natalya Z. Alieva, Irina B. Kushnir, and Anton N. Samodelov	
<b>The Digital Approach to Managing Region's Marketing Activities for Accelerating Its Growth and Development</b> . . . . .	647
Yulia I. Dubova	
<b>Social Environment of the Fourth Industrial Revolution and Its Consequences for Mankind</b>	
<b>Research on Employers' Attitude Towards Elderly Workers</b> . . . . .	657
Elena B. Zavyalova and Tatyana Krotova	
<b>Vocational Training and Re-skilling of Senior Citizens</b> . . . . .	671
Ellina A. Shamanina and Anastasia E. Bryzhinskaya	

<b>Effective Leadership to Senior Workforce: Opportunities and Challenges</b> . . . . .	689
Olga Dubovskaya and Vladimir Naumets	
<b>Entrepreneurship at a Mature Age</b> . . . . .	695
Elena B. Zavyalova, Evgeniya A. Starikova, and Natalia N. Chubaeva	
<b>Uniform Approximations for Solutions of a Singularly Perturbed System of Differential Equations in a Particularly Critical Case</b> . . . . .	707
S. Karimov and G. Anarbaeva	
<b>Classification of Constitutional Principles of the Modern Economic System</b> . . . . .	715
E. E. Barinov, L. G. Berlyavskiy, M. A. Manukyan, and Sh. M. Nuradinov	
<b>Archetype of “Self/Other” in Modern European Social Advertising</b> . . . .	725
Marina V. Aksenova, Tatyana G. Charchoglyan, Ekaterina V. Ignatyeva, Anna V. Merzlyakova, and Yuliya V. Ryabkova	
<b>Diagnostics of Methodological Competence Development of Preschool Teachers</b> . . . . .	731
Lyudmila V. Aleksieienko-Lemovska	
<b>Assessing the Impact of Intellectual Potential on the Innovative Development of Resource-Based Region</b> . . . . .	740
Zoya A. Vasilieva, Anastasiya N. Rusina, Irina S. Bagdasarian, and Irina V. Filimonenko	
<b>Regional Identity and Assessment of the Quality of Life by the Population (In Terms of Empirical Research in the Samara Region)</b> . . . . .	755
Irina Tsvetkova, Tatyana Ivanova, Evgeniya Zhelnina, and Natalya Gorbacheva	
<b>Strategies of Developing a Risk Map in Space and Time Axes in the Regional Labor Markets</b> . . . . .	764
Zoya A. Vasilieva, Anastasiya N. Rusina, Irina V. Filimonenko, and Natalia V. Raznova	
<b>Foreign Language as Intellectual Resource and Value in Modern Conditions in Professional Activity of Manager</b> . . . . .	776
Maria V. Boyko, Ludmila V. Guseva, Olga M. Kim, Natalia S. Pronina, and Aleksandr N. Shamov	
<b>Opportunities and Prospects of Using Chatbots in HR</b> . . . . .	782
Evgeniy E. Egorov, Tatyana E. Lebedeva, Maria P. Prokhorova, Tatyana N. Tsapina, and Anzhelika A. Shkunova	



<b>About the Possibility to Combine Reduction of Working Time and the Retirement Age Increase . . . . .</b>	<b>792</b>
Aleksandr V. Zolotov, Tatyana N. Demicheva, Michael V. Shilov, Marina V. Zolotova, and Irina P. Denisova	
<b>Activation of Foreign Language Communicative Competence Components in Specialists' Professional Work . . . . .</b>	<b>799</b>
Natalia S. Pronina, Marina I. Klyueva, Maria V. Zimina, Natalya A. Lyulyaeva, and Tatyana A. Perova	
<b>Experience of Experimental Area Development in the System of Professional Education . . . . .</b>	<b>808</b>
Anna V. Lapshova, Julia A. Kulagina, Daria G. Sidorova, Olga V. Golubeva, and Irina M. Morozova	
<b>Philosophical Aspects of the Development of Technique and the Destiny of a Human . . . . .</b>	<b>816</b>
Tahir M. Makhamatov, Timur T. Makhamatov, and Saida T. Makhamatova	
<b>Development of Children's Supplementary Education as a Component of the University's Third Mission . . . . .</b>	<b>826</b>
B. Ch. Meskhi, S. V. Ponomareva, E. A. Ugnich, and M. G. Drozd	
<b>Extraterritorial Obligations in Core International Human Rights Treaties . . . . .</b>	<b>835</b>
Aliya A. Amirova	
<b>Assessing the Experience of Development of Personality's Creative Potential in the Industry of Educational Services . . . . .</b>	<b>841</b>
Asya Arutyunova	
<b>Corporate Social Responsibility of Commercial Banks at the Present Stage: Scientific and Technological Revolution . . . . .</b>	<b>851</b>
Natalia E. Brovkina and Helena P. Ternovskaya	
<b>Deculturation of Economic Activity as a Systemic Challenge . . . . .</b>	<b>859</b>
Andrey Y. Bolshunov, Alexander G. Tyurikov, and Sofiya A. Bolshunova	
<b>A Systemic Approach to the Development of the Theory of Economic Interaction of the Institution of Farming and a Socially-Oriented Environment of a New Type . . . . .</b>	<b>866</b>
Lyudmila Yu. Pitserskaya, Tatyana G. Gurnovich, George A. Baum, and Sergey D. Fetisov	
<b>Human Rights Protection Challenges Affecting Christians – Forced Migrants in Europe . . . . .</b>	<b>875</b>
Nataliya S. Semenova, Ekaterina V. Kiseleva, and Ekaterina N. Mamaeva	

<b>The Scientific and Technical Revolution in the Context of Capitalism: Estrangement vs Social Progress . . . . .</b>	<b>884</b>
Dmitry P. Sokolov and Igor V. Astafyev	
<b>Features of the Social Institution Management . . . . .</b>	<b>892</b>
V. I. Surat, M. S. Santalova, I. V. Soklakova, and D. K. Balabanova	
<b>Relations of Control in the Management of Integration Processes of Innovation in the Knowledge Economy . . . . .</b>	<b>907</b>
Larisa N. Drobyshevskaya, Vasilij V. Chaplya, Ekaterina D. Popova, and Svetlana A. Kovalenko	
<b>The Problem of Manipulative Interference in the Processes of Identification and Self-identification of an Individual in the Conditions of the Information Society Functioning . . . . .</b>	<b>915</b>
Anna S. Petrakova, Tatiana G. Martseva, Irina N. Voblaya, and Elena N. Seifieva	
<b>Change of the Level of Working Capacity of a Student in the System of Professional Education Under Mental Load . . . . .</b>	<b>925</b>
Yury N. Petrov, Alexey Y. Petrov, Nina S. Petrova, Nadezhda V. Syrova, and Olga N. Filatova	
<b>Interconnection Between the Behavior and Needs of Employable Population in the System of the Pleasure Economy . . . . .</b>	<b>932</b>
Chinara R. Kulueva, Kanikey B. Seitova, Gulmira R. Abdyaeva, Zhannat K. Rayimberdieva, and Aynura S. Uzakbaeva	
<b>Place and Role of Human in the System of Circular Reproduction in the Digital Regional Economy . . . . .</b>	<b>943</b>
Gulzat K. Tashkulova and Elena V. Kletskova	
<b>Quantification of Socio-Economic Effects of Strategic Development of Small Business in the System of the Digital Economy . . . . .</b>	<b>952</b>
Yuliya V. Melnikova, Anna V. Shokhnekh, Victoria S. Telyatnikova, and Ludmila I. Nasonova	
<b>Aitmatov's Characters Infusing the Heart of a Child with the Good and Their Study at School . . . . .</b>	<b>960</b>
A. A. Mamatova, Bekmurza Zuluyev, and M. U. Muzulmanov	
<b>Semantic and Structural Peculiarities of Proverbs and Sayings in the Form of a Compound Sentence with a Meaning of Comparisons . . . . .</b>	<b>969</b>
Parida M. Kaiymova, Nurzhama A. Mapaeva, Uyalkhan N. Kamardinova, Dinara A. Yzabekova, and Kapar Z. Zulpukarov	

<b>There Is a Need of Protecting Children from Sexual Information Disseminated Through Information and Communication Technologies . . . . .</b>	<b>976</b>
Liudmila A. Bukalerova, Alexander V. Ostroushko, Saule M. Naurzalieva, and Anzhela V. Dolzhikova	
<b>Regulatory Framework of the Fourth Industrial Revolution: Experience and Prospects</b>	
<b>Indirect Law Regulation of the Economy in Russia . . . . .</b>	<b>987</b>
Liudmila A. Bukalerova, Alexander V. Ostroushko, Dmitry V. Karpuhin, and Olesya V. Merkusheva	
<b>Criminal Liability for Escape from Arrest or Detention . . . . .</b>	<b>996</b>
M. M. Kobleva, E. Y. Korunenkov, V. A. Ovsyannikov, and I. A. Podroykin	
<b>Dysfunctionality of Government . . . . .</b>	<b>1002</b>
D. V. Pozharskiy, A. A. Kosykh, N. F. Nasretidinova, and V. O. Chernakov	
<b>Labor Opportunism Amongst Agricultural Business Workers: Legal Forms of Manifestation and Ways to Overcome It . . . . .</b>	<b>1011</b>
A. A. Sapfirova, V. V. Volkova, and E. V. Khakhaleva	
<b>Salvage at Sea: International Law Problems . . . . .</b>	<b>1018</b>
N. A. Butakova and T. N. Ivanova	
<b>The Legal Essence of the State Administration Methods and Their Correlation . . . . .</b>	<b>1026</b>
O. V. Grechikina, A. V. Zubach, P. N. Safonenkov, and O. V. Shmaliy	
<b>The State Regulatory Policy as a Factor of the Proper Legal Regulation . . . . .</b>	<b>1036</b>
Vitaly V. Vanin, Lesya A. Dushakova, Stanislav D. Mogilevsky, and Oksana V. Shmaliy	
<b>Theoretical and Legal and Law Enforcement Aspects of the Liability for the Breach of Civil Obligations in Russia. . . . .</b>	<b>1046</b>
T. A. Skvortsova, O. I. Korolevskaya, E. V. Trunova, and V. S. Kirilenko	
<b>Violence as a Way of Self-expression: A Legal Aspect . . . . .</b>	<b>1056</b>
N. V. Petrasheva, G. A. Diatlov, A. A. Kulikova, and L. A. Spektor	
<b>Arbitration Proceedings in the Refusal of One of the Parties to the Dispute to Participate in the Process: International Legal Aspects . . . . .</b>	<b>1061</b>
Luo Lan	
<b>Climate Change Mitigation and Renewable Energy Sources: International Legal Issues . . . . .</b>	<b>1068</b>
A. Kh. Abashidze, A. M. Solntsev, and R. D. Akshalova	

<b>Countering the Legalization of Criminal Income as a Factor to Deal with the Risk of Terrorist Threats and Increasing Competitiveness in Foreign Economic Markets . . . . .</b>	<b>1076</b>
Dmitry A. Artemenko, Vladimir N. Gurba, and Maria A. Evnech	
<b>Realization of the Right to Health by People with Mental Illnesses . . . .</b>	<b>1089</b>
A. A. Belousova	
<b>Warranties of Public-Law Entity as a Type of Debt Obligation in a Systemic Economy . . . . .</b>	<b>1094</b>
Georgiy N. Kutsuri, Lola D. Sanginova, and Svetlana S. Galazova	
<b>Legal Regulation of the Development of Breakthrough Technologies in Russia . . . . .</b>	<b>1102</b>
Svetlana S. Gorokhova, Anna V. Popova, Yulia I. Shupletsova, and Natalia V. Putilo	
<b>Environmental Migration and International Law: Contemporary Challenges . . . . .</b>	<b>1112</b>
D. V. Ivanov	
<b>Antitrust Law Indemnity in the Russian Federation . . . . .</b>	<b>1119</b>
Yu. A. Artemyeva, E. P. Ermakova, O. V. Protopopova, and E. E. Frolova	
<b>Global Blockchain Jurisdiction: Prospects and Features of Use in Russian Realities . . . . .</b>	<b>1136</b>
Julia A. Gavrilova, Oleg Y. Rybakov, Elena A. Antonyan, and Natalya V. Sharueva	
<b>Property Theory: Methodological Approaches to the Problem of Specification and Protection of Property Rights . . . . .</b>	<b>1143</b>
Olga V. Karamova, Alexandra E. Sergeeva, and Evgeny V. Sumarokov	
<b>Tokens: Actual Problems of Determining the Legal Status and Classification . . . . .</b>	<b>1152</b>
Stanislav V. Odintsov, Valentina A. Koncheva, and Marina V. Trubina	
<b>Modernization of the System of State Registration of Real Estate as a Factor in the Development of State-Legal Regulation of Entrepreneurial Activity in the Russian Federation . . . . .</b>	<b>1159</b>
Oksana N. Petyukova and Aimée M. L. Tshibola	
<b>Foresight: Outlook for the Legal Framework of the National Legal System in the Future . . . . .</b>	<b>1166</b>
Yuliya O. Pronina, Varvara V. Bogdan, and Oxana B. Novruzova	
<b>Fuzzy Cognitive Modeling of the Integral Level of Regional Food Security . . . . .</b>	<b>1173</b>
A. F. Rogachev, E. N. Antamoshkina, E. V. Melikhova, and T. V. Pleschenko	

<b>Organization of Interaction Within the Model of Regional Economic Integration</b> . . . . .	1182
Tatyana A. Rudakova, Oksana Yu. Rudakova, Inna N. Sannikova, Olga V. Kozhevina, and Nadezhda D. Usvyat	
<b>Specificity and Problems of the Settlement of Economic Disputes Between the ASEAN Member States</b> . . . . .	1195
A. A. Saidmukhtorov	
<b>Illegal Receipt of Information Containing Trade Secrets (Commercial Espionage) as a Threat to Fair Competition</b> . . . . .	1205
Viacheslav V. Sevalnev, Uriy V. Trunzevskiy, and Artem M. Tsirin	
<b>Destruction of the National State Economic System by Means of Global Politics (Experience of Modern Russia)</b> . . . . .	1217
Sergey S. Slepakov, Natalia N. Novoselova, Rashid K. Kecherukov, and Vladimir A. Fadeev	
<b>Challenges for BRICS Today and Tomorrow</b> . . . . .	1224
Elena A. Zvonova, Galina A. Bunich, Irina Z. Yarygina, and Anastasia V. Zhiglyayeva	
<b>Pursuing a Regional Housing Policy: Methods, Approaches and Mechanisms</b> . . . . .	1234
Sergey A. Korostin	
<b>Best Practices of the States of the Romano-Germanic Legal System in Countering Bankruptcy Crimes</b> . . . . .	1242
Oleg A. Yastrebov, Rinat R. Sapparov, and Liudmila A. Bukaleroa	
<b>Causes of Juvenile Delinquency in the Republic of Kazakhstan</b> . . . . .	1250
Saule M. Naurzalieva, Alexandra S. Vasilenko, Mariya A. Simonova, Dmitriy V. Bondarenko, and Piotr K. Dolzhikov	
<b>Criminal Responsibility for Child Sexual Abuse in the Law of the Leading Countries of the World</b> . . . . .	1259
Ludmila A. Bukaleroa and Irina I. Skripova	
<b>Deradicalization of Prisoners in the Scandinavian Countries as a Milestone Phenomenon of Circular Economy</b> . . . . .	1266
Maxim A. Yavorskiy, Irina E. Milova, Renat R. Khasnutdinov, and Danila D. Osipov	
<b>Differentiation and Integration of the Norms of Executive Law</b> . . . . .	1277
Aleksei A. Chistyakov, Yulia A. Golovastova, and Kirill A. Chistyakov	

<b>Probabilistic Model of Implementing Mediation into Russia's Criminal Procedure in the Conditions of Society's Digital Transformation</b> . . . . .	1286
Aleksandra S. Vasilenko, Vladimir M. Filippov, Maria A. Simonova, and Sergey A. Kovalenko	
<b>The Genesis and the Current State of Domestic and Foreign Legal Thought in Countering Extremism in Penal Institutions as a Manifestation of Liberal Economic Processes</b> . . . . .	1294
Maxim A. Yavorskiy, Irina E. Milova, Renat R. Khasnutdinov, and Danila D. Osipov	
<b>Experience of the States of the Anglo-Saxon System of Law in Countering Market Manipulation and Unlawful Use of Insider Information</b> . . . . .	1307
Semyon I. Adinyaev, Lyudmila A. Bukalerova, and Alexandra S. Vasilenko	
<b>Effects of the Fourth Industrial Revolution on the Environment: Climatic Change and "Green" Prospects of the Digital Economy</b> . . . . .	1317
<b>Systemic Issues of Bee Breeding in Russia</b> . . . . .	1317
Ivan F. Gorlov, Vasily I. Komlatsky, Elena Yu. Zlobina, Aleksander A. Mosolov, and Daria A. Mosolova	
<b>Features of Sustainable Enterprise Development</b> . . . . .	1326
Natalia S. Andryashina, Ekaterina P. Garina, Alexander P. Garin, Zhibek B. Seitova, and Bolotbek M. Seitov	
<b>Sustainable Development of Regions of Russia in the Conditions of the "Green Economy" (Estimation Problems)</b> . . . . .	1335
Lyubov Yu. Arkhangelskaya, Victor N. Salin, Victor N. Prasolov, and Larisa Ev. Danilina	
<b>Efficiency of Eco-Management in Agriculture</b> . . . . .	1346
Tatyana M. Vorotinceva, Alena A. Veselko, Aleksei M. Sorokin, Khosiyat S. Imomnazarova, and Elena I. Andreeva	
<b>Small Island Developing States' (SIDS) Problems in the Focus of Sustainable Developing Goals (SDGs)</b> . . . . .	1354
Victoria I. Mikheeva	
<b>Methodological Approach to the Classification of Digital Economies by Environmental Efficiency and Sustainability Criterion</b> . . . . .	1360
Elena V. Merdesheva, Olga V. Titova, and Pavel T. Avkopashvili	

<b>A Systemic Approach to the Study of the Sustainability of the Global Digital Economy: Economies of Scale, Ratchet Effect and Hysteresis Effect . . . . .</b>	<b>1369</b>
Larisa I. Nekhvyadovich, Vladimir A. Borodin, and Pavel T. Avkopashvili	
<b>Newest Trends and Future Scenarios for a Sustainable Digital Economy Development . . . . .</b>	<b>1378</b>
Evgeny E. Shvakov and Elena A. Petrova	
<b>Eco-Efficiency Models for the Future of the Global Digital Economy: Convergence or Divergence . . . . .</b>	<b>1386</b>
Maria G. Sukhova, Evgeny E. Shvakov, and Marina N. Lyovkina	
<b>Digital Technologies as a Path to the “Green” Economy: Financial Effectiveness vs. Ecological Responsibility . . . . .</b>	<b>1394</b>
Elena A. Yaitskaya, Vitaliy V. Mishchenko, and Tatyana A. Yakushina	
<b>Integrating the “Green Economy” into the Model of Digital Future of the Modern Socio-Economic Systems . . . . .</b>	<b>1402</b>
Evgeny M. Karataev, Vladimir V. Merkuryev, and Olga V. Titova	
<b>The Fourth Technological Paradigm as a Vector of Sustainable Development of the Modern Digital Economy: Implications for Society, Government and Entrepreneurship . . . . .</b>	<b>1411</b>
Elena V. Kletskova, Olga V. Titova, and Victoria V. Vorobyova	
<b>Technological Infrastructure of the “Green” Digital Economy: Measurement and Management Methodology . . . . .</b>	<b>1420</b>
Irina Sh. Dzakhmisheva, Olga V. Titova, and Darya S. Robets	
<b>Technology for the “Green” Digital Future: Productivity and Efficiency vs. Security and Sustainability . . . . .</b>	<b>1431</b>
Madina V. Blieva, Galina G. Vukovich, and Olga I. Ergardt	
<b>Mass “Green” Digital Technologies in the Economy: The Future and the Present . . . . .</b>	<b>1440</b>
Zalina L. Kantsalieva, Darima A. Kozhanova, and Andrey A. Bezhovets	
<b>Overview of Promising Educational Services for a “Green” Digital Future: Online, Lifelong and Distance Learning . . . . .</b>	<b>1449</b>
Darima A. Kozhanova, Oxana M. Makhalina, and Kirill A. Kirilin	
<b>Product Life Cycle in the Circular Economy: Economic Priorities vs. Environmental Priorities . . . . .</b>	<b>1456</b>
Julia G. Gazukina, Olga N. Shvakova, and Kseniya A. Melekhova	
<b>“Knowledge Economy” as a Mechanism of Social Adaptation to the “Green” Digital Future . . . . .</b>	<b>1464</b>
Larisa I. Nekhvyadovich, Viktor N. Makhalin, and Elena V. Gubkina	

<b>Eco-economic Component of Digital Future in the Model of Sustainable Development of Economy</b> .....	1473
Oksana V. Klimova, Toskanay A. Kuttubaeva, and Olga V. Titova	
<b>Financing of the Fourth Industrial Revolution and the Prospects for Improving the Investment Attractiveness of the Digital Economy</b>	
<b>Two-Stage DEA: An Application in Banking</b> .....	1483
Kristína Kočíšová	
<b>The Token and Blockchain Economy: Risks, Opportunities, and Implication</b> .....	1518
Fabian Teichmann and Marie-Christin Falker	
<b>Blockchain Technology and Cryptocurrencies: An Alternative to Central Banking?</b> .....	1532
Fabian Teichmann and Marie-Christin Falker	
<b>Blockchain: Implications of the Impending Token Economy</b> .....	1551
Fabian Teichmann and Marie-Christin Falker	
<b>Technology of the Information Modeling as an Innovative Form of Managing the Investment and Construction Process</b> .....	1566
Valery N. Barinov, Natalia I. Trukhina, Oksana V. Kornitskaya, Ella Y. Okolelova, and Alexey V. Shulgin	
<b>National Debt in Industry 4.0 in Developing Countries: Analysis of the Influence of Digitization and Perspectives of Reduction of Debt Obligations</b> .....	1572
Karina V. Matvienko and Elizaveta A. Milkina	
<b>The Mechanism of Participation of State and Foreign Capital in the Investment Provision of Large Companies</b> .....	1581
Chatkalbay K. Rayimbaev, Alisher S. Yusupov, and Uchkunbek T. Shamshidinov	
<b>Accounting Policies for Financial Instruments of Organizations in the Modern Conditions of the Innovative Economy</b> .....	1588
Tatyana Y. Druzhilovskaya, Emilia S. Druzhilovskaya, Tatuana N. Korshunova, Irina P. Denisova, and Petr V. Denisov	
<b>Influence of Modern Financial Technologies (Fintech) on the Institutional Composition of the Russian Banking System</b> .....	1596
Larisa S. Aleksandrova, Aleksandr V. Berdyshev, Olga V. Zakharova, and Sergey S. Matveevskiy	
<b>Foreign Investment as a Factor of Economic Progress: Russian and European Vectors</b> .....	1604
Marina L. Galas	



<b>Individuals' Capital Allocation in Different Jurisdictions Within the Context of International Tax Transparency: Improving the Global Approaches to Financial Regulation . . . . .</b>	<b>1612</b>
Ekaterina A. Tsepova	
<b>Creation of a Single Information Resource Within the Framework of the Registration and Accounting Function as a Factor in Increasing the Efficiency of Land Management . . . . .</b>	<b>1627</b>
Tatyana V. Volkova	
<b>Analysis of Regional Performance Management of Tax Administration . . . . .</b>	<b>1633</b>
Valentina B. Dzobelova, Alisa V. Olisaeva, Anvarjon A. Isokov, and Oksana V. Torchinova	
<b>Value Added Tax: Problems Affecting GDP. . . . .</b>	<b>1642</b>
Irina A. Zhuravleva, Natalia A. Nazarova, and Larisa P. Grundel	
<b>Some Aspects of Forecasting and Evaluating the Effectiveness of Investments in the System of Management of Oil Production and Refining Industry in the Region . . . . .</b>	<b>1653</b>
Alexander A. Silaev, Mikhail I. Kuternin, Galina Yu. Parshikova, and Alexey A. Perfiljev	
<b>Technological Changes in the Finance Industry: Regulation and Supervision Challenges . . . . .</b>	<b>1664</b>
Oleg B. Anikin, Boris A. Anikin, and Boris B. Loguinov	
<b>Banking Russia: Systemic Deformation and Potential for Development . . . . .</b>	<b>1670</b>
Georgy M. Mishulin and Alexander V. Gubin	
<b>Problems of Competition Between Commercial Banks and Technology Companies in the Market of Innovative Products and Services . . . . .</b>	<b>1681</b>
I. V. Pashkovskaya and N. A. Kovaleva	
<b>The Protection of Mutual Funds Investors' Rights in the Context of Digitalization: Russian and Foreign Practice . . . . .</b>	<b>1688</b>
Oksana N. Petyukova and Maria A. Mikhaleva	
<b>The Influence of Modern Financial Technologies at the Level of the Shadow Economy and Banking . . . . .</b>	<b>1697</b>
Helena P. Ternovskaya and Sisheng Yuan	
<b>Trends in Assessment of the Tax System's Competitiveness in the Context of Shifting to the 'Industry 4.0' Concept . . . . .</b>	<b>1707</b>
El'vira Chelysheva, Tat'yana Saltanova, Tat'yana Mikhnenko, and Nataliya Shelepova	

**The Effect of Capital Structure Management on Commercial Bank  
Financial Performance: A Case of the Zambian Banking Sector . . . . . 1716**  
Macmillan Handema and Lubinda Haabazoka

**Conclusion . . . . . 1737**

**Author Index . . . . . 1739**

# **“Intelligent” Technologies and Artificial Intelligence: Promising Directions of Application in Present-Day Economy**



# Overview of Promising Educational Services for a “Green” Digital Future: Online, Lifelong and Distance Learning

Darima A. Kozhanova<sup>1</sup>(✉), Oxana M. Makhalina<sup>2</sup>,  
and Kirill A. Kirilin<sup>3</sup>

<sup>1</sup> Gorno-Altai State University, Gorno-Altai, Russia  
darima.murzagulo@mail.ru

<sup>2</sup> State University of Management, Moscow, Russia  
moxanam@mail.ru

<sup>3</sup> Altai State University, Barnaul, Russia  
kirilink@bk.ru

**Abstract.** Purpose: The aim of the work is to review promising educational services of “green” digital future and to develop conceptual models of online, lifelong, distance learning aimed at mastering “green” competencies on the EdTech platform.

Design/methodology/approach: The authors apply a regression analysis method used to identify the contribution of the digital education index (EdTech), calculated by the IMD when compiling the digital competitiveness index (the “knowledge” index), to the formation of the education index (duration of studies in years), calculated by the UNDP when compiling the human development index. In order to obtain as informative and reliable results as possible, the top 10 countries in terms of the level of development of the “green” economy in 2019 according to the Dual Citizen rating were selected as targets for the study.

Findings: The results of the study showed that digital education - EdTech - can make a significant contribution to building a “green” digital future, as it will allow mass mastering of “green” competencies, distinguishing individual and corporate learning, taking into account the requirements and priorities of all stakeholders.

Originality/value: It has been proved that currently, as of 2019, due to EdTech’s failure to realize its potential for sustainable development, digital education is not contributing to education and training for a “green” digital economy, even in the top 10 “green” economies. Developed and presented conceptual models of educational services for a “green” digital future, delivered in the form of online, lifelong and distance learning, will solve this problem.

**Keywords:** Promising educational services · “Green” digital future · Online learning · Lifelong learning · Distance learning · Digital education (EdTech)

**JEL Code:** D91 · E01 · F42 · F43 · F64 · Q01 · Q15 · O31 · O32 · O33 · O38 · Q56 · Q57 · O13 · O41 · O43 · O44 · O47

## 1 Introduction

There is an “institutional trap” to achieving sustainable development goals. The essence of the trap is that environmental protection values were formed throughout the 20th century and by the beginning of the 21st century have become widely shared and supported. Social values have received a wide response in the business environment, expressed through the annual publication of corporate environmental responsibility reports, first by the largest shareholder companies in the industry, then by companies of all sizes, legal forms and industries. With the readiness of society and business, governments around the world began to tighten environmental norms and standards for resource and energy consumption, and sustainable development goals were adopted internationally.

However, without the necessary educational support, people are not fully aware of their ability to participate in responsible consumption, and with a lack of “green” people (workers capable of applying environmentally sound technologies and capable of creating environmental innovations), corporate responsibility practices are very restrained and “small-scale”. As “green” practices are voluntary initiatives by people and businesses, they suffer from a lack of funding, which is mainly directed towards technological upgrading, which prevents private investment in the development and delivery of “green” education courses.

The state also suffers from a budget deficit and therefore cannot place public orders for the creation of these courses, the training of “green” personnel and the implementation of regional programs of “green” literacy of the population, similar to the financial and digital literacy programs, actively implemented in recent years. Since the availability of “green” competences cannot guarantee a modern employee either a better chance of employment or additional income, the following requirements are imposed on educational services that ensure the mastering of these competences.

Firstly, it is price availability that should be noted. These educational services must be low cost because the cost may not pay off. In the absence of a government order, obtaining educational services on a contractual (market) basis should be beneficial for universities and therefore not available to the general public. The traditional form of providing educational services for mastering “green” competences makes them elitist. Secondly, consumers are often interested only in the educational services themselves and the competences acquired as a result of their “green” competences, and therefore no diploma is required. Therefore, the mastering of these competences should be possible in self-study.

Thirdly, “green” technologies are being improved as a result of scientific and technological progress, so continuous learning is needed to constantly master new technologies in order to realize the fullest potential for sustainable development. Fourthly, many workers are interested in acquiring “green” competencies, but cannot combine traditional education with work even by correspondence and evening classes. In other words, a flexible individual learning schedule should be available. All these requirements are met by digital education - EdTech. Already today, online, lifelong and distance education is provided on the EdTech platform.

This is the basis for our hypothesis that the “institutional trap” of the impossibility of achieving sustainable development goals with a lack of “green” competencies and the inaccessibility of educational services to master them can be overcome by developing EdTech in a “green” direction. The aim of the work is to review promising educational services for a “green” digital future and to develop conceptual models of

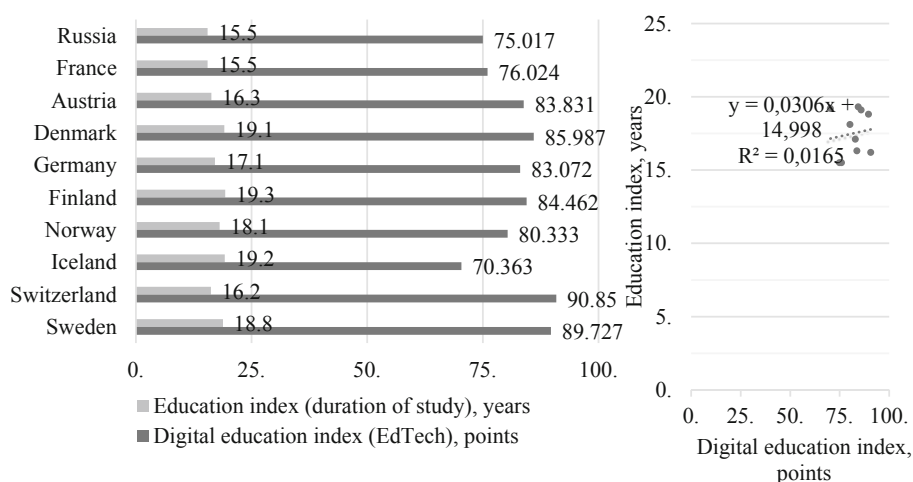
online, lifelong, distance learning aimed at mastering “green” competencies on the EdTech platform.

## 2 Materials and Method

The literature review found that selected issues for the future development of the “green” economy are reflected in works by Frolov et al. (2017), Morozova et al. (2019), Popkova et al. (2014), Popkova et al. (2016), Pozdnyakova et al. (2017), and future scenarios for the digital economy are discussed in studies by Belik et al. (2020), Petrenko and Shevyakova (2019), Popkova (2019), Popkova and Sergi (2020), Popkova and Gulzat (2020a), Popkova and Gulzat (2020b), Popkova et al. (2018), Popkova and Zmiyak (2019), Popkova and Sergi (2019), Ragulina (2019a), Ragulina et al. (2019b), Sergi (2019), Sergi et al. (2019), Stolyarov et al. (2020). However, the contribution of education and promising educational services to a “green” digital future are not identified—this work is intended to fill this gap.

To verify this hypothesis, the paper uses the regression analysis method to identify the contribution of the digital education index (EdTech) calculated by the IMD when compiling the digital competitiveness index (the “knowledge” index) to the education index (duration of studies in years) calculated by the UNDP when compiling the human development index.

Since there are no separate statistics on “green” education in order to obtain as informative and reliable results as possible, the top 10 countries in terms of the level of development of the “green” economy in 2019 according to the Dual Citizen rating (2020) have been selected as targets for the study. Initial statistics and the result of its processing as a regression model are presented in Fig. 1.



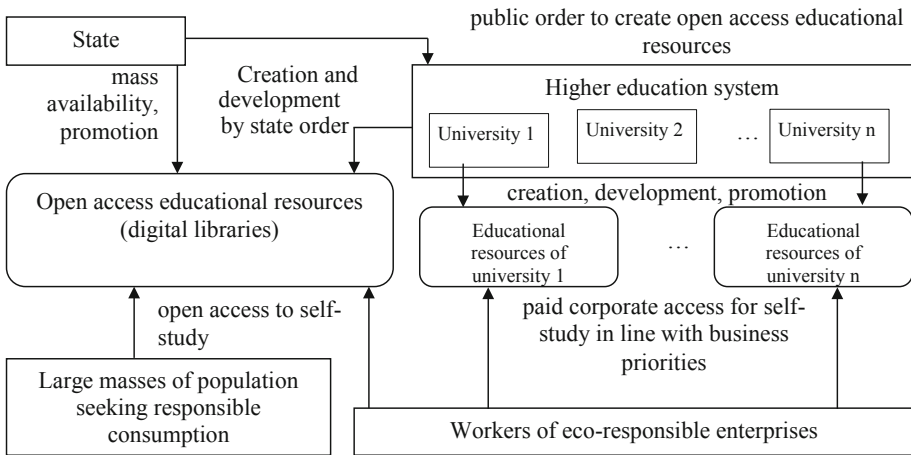
**Fig. 1.** Education statistics (y) and EdTech (x) and regression relation  $y = F(x)$  in the top 10 “green” countries of the economy in 2019 Source: compiled and calculated by the authors based on Dual Citizen (2020), IMD (2020).

According to Fig. 1, the highest level of digital education (EdTech) in 2019 is in Switzerland (90.85 points) and Sweden (89.727 points), with the highest level of education as a duration of study is in Finland (19.3 years) and Iceland (19.2 years). Even in the top 10 countries in terms of the level of development of the “green” economy in 2019 the dependence of the level of education on the development of EdTech is very small, but it exists, which is most important in the context of this study.

Thus, according to the obtained equation of paired linear regression, when the value of digital education index increases by 1 point, the value of education index increases by 0.0306 year, the correlation of indicators is 1.65%. Therefore, new conceptual models of educational services within the framework of EdTech are in demand to implement a “green” digital future, in which digital education will increase the availability of education to “green” competences.

### 3 Results

In this study, the following 3 conceptual models of educational services for a “green” digital future have been developed in EdTech in various forms: online learning (Fig. 2), lifelong learning (Fig. 3) and distance learning (Fig. 4).

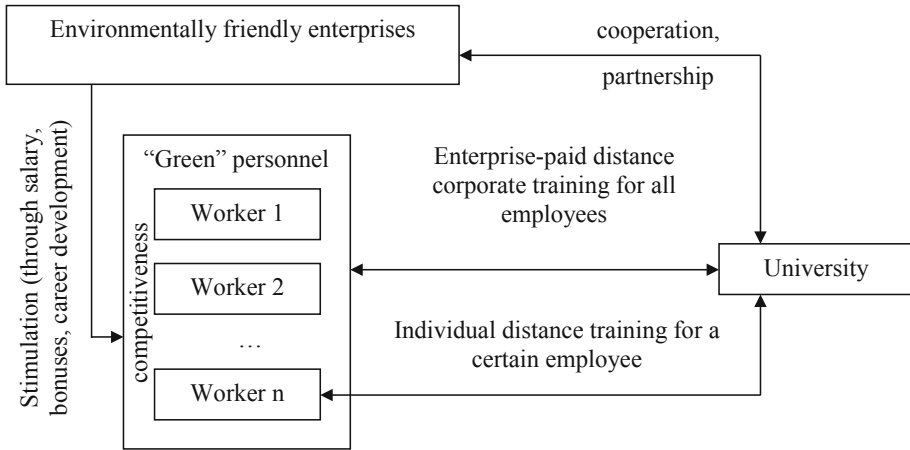


**Fig. 2.** The conceptual model of educational services for a “green” digital future, provided in the form of online learning Source: designed and compiled by the authors.

As shown in Fig. 2, in the model of online learning, the state places a state order to the system of science and higher education to create educational resources (digital libraries) of open access. Open educational resources are freely available for self-study by the general public seeking responsible consumption. The state provides mass availability and promotes these resources.







**Fig. 4.** Conceptual model of educational services for a “green” digital future provided in the form of distance learning Source: designed and compiled by the authors.

## 4 Conclusion

The results of the study showed that digital education - EdTech - can make a significant contribution to building a “green” digital future, as it will allow mass mastering of “green” competencies, distinguishing individual and corporate learning, taking into account the requirements and priorities of all stakeholders. Currently, as of 2019, due to EdTech’s failure to realize its potential for sustainable development, digital education is not contributing to education and training for a “green” digital economy, even in the top 10 green economies. Developed and presented conceptual models of educational services for a “green” digital future, delivered in the form of online, lifelong and distance learning, will solve this problem.

## References

- Belik, E.B., Petrenko, E.S., Pisarev, G.A., Karpova, A.A.: Influence of technological revolution in the sphere of digital technologies on the modern entrepreneurship. Lecture Notes in Networks and Systems, vol. 91, pp. 239–246 (2020)
- Dual Citizen: The Global Green Economy Index (2020). [https://dualcitizeninc.com/global-green-economy-index/index.php#interior\\_section\\_link](https://dualcitizeninc.com/global-green-economy-index/index.php#interior_section_link). Accessed 07 Jan 2020
- Frolov, D.P., Popkova, E.G., Strekalova, A.S., Marushchak, I.V.: Strategic planning of regional ecological development: adaptation of Elinor Ostrom’s principles in Russia. Contributions to Economics, pp. 39–45 (2017). (9783319552569)
- IMD: World Digital Competitiveness Ranking 2019 (2020). <https://www.imd.org/wcc/world-competitiveness-center-rankings/world-digital-competitiveness-rankings-2019/>. Accessed 06 Jan 2020

- Morozova, I.A., Popkova, E.G., Litvinova, T.N.: Sustainable development of global entrepreneurship: infrastructure and perspectives. *Int. Entrep. Manage. J.* **15**(2), 589–597 (2019)
- Petrenko, E.S., Shevyakova, A.L.: Features and perspectives of digitization in Kazakhstan. *Studies in Computational Intelligence*, vol. 826, pp. 889–899 (2019)
- Popkova, E.G.: Preconditions of formation and development of industry 4.0 in the conditions of knowledge economy. *Studies in Systems, Decision and Control*, vol. 169, no. 1, pp. 65–72 (2019)
- Popkova, E.G., Sergi, B.S.: Human capital and AI in industry 4.0. convergence and divergence in social entrepreneurship in Russia. *J. Intell. Cap.* (2020). In press, 2020
- Popkova, E.G., Dubova, Y.I., Yakovleva, E.A., Azarova, N.A., Titova, E.V.: Role of ecological marketing in formation and development of ecological cluster. *Asian Soc. Sci.* **10**(23), 1–8 (2014)
- Popkova, E.G., Gulzat, K.: Technological revolution in the 21st century: digital society vs. artificial intelligence. *Lecture Notes in Networks and Systems*, vol. 91, pp. 339–345 (2020a)
- Popkova, E.G., Gulzat, K.: Contradiction of the digital economy: public well-being vs. cyber threats. *Lecture Notes in Networks and Systems*, vol. 87, pp. 112–124 (2020b)
- Popkova, E.G., Morozova, I.A., Litvinova, T.N.: Transformational processes in the media system under industry conditions 4.0: future outlines and perspectives (reflections on the article by Alexander P. Sukhodolov, DSc. In Economics, Professor and Irina A. Kuznetsova, Ph.D. in Engineering, Associate Professor “Designing the mass media as a homeostatic system by means of automation engineering: Basic concepts, structure, components”)”. *Theor. Pract. Issues J.* **7**(1), 145–154 (2018)
- Popkova, E.G., Shakhovskaya, L.S., Abramov, S.A., Natsubidze, A.S.: Ecological clusters as a tool of improving the environmental safety in developing countries. *Environ. Dev. Sustain.* **18** (4), 1049–1057 (2016)
- Popkova, E.G., Zmiyak, K.V.: Priorities of training of digital personnel for industry 4.0: social competencies vs technical competencies. *Horizon* **27**(3–4), 138–144 (2019)
- Popkova, E.G., Sergi, B.S. (eds.): *Digital Economy: Complexity and Variety vs Rationality*. Springer International Publishing, Heidelberg (2019)
- Pozdnyakova, U.A., Popkova, E.G., Kuzlaeva, I.M., Lisova, O.M., Saveleva, N.A.: Strategic management of clustering policy during provision of sustainable development. *Contributions to Economics*, pp. 413–421 (2017). (9783319454610)
- Ragulina, Y.V.: Priorities of development of industry 4.0 in modern economic systems with different progress in formation of knowledge economy. *Studies in Systems, Decision and Control*, vol. 169, pp. 167–174 (2019a)
- Ragulina, Y.V., Alekseev, A.N., Strizhkina, I.V., Tumanov, A.I.: Methodology of criterial evaluation of consequences of the industrial revolution of the 21st century. *Studies in Systems, Decision and Control*, vol. 169, pp. 235–244 (2019b)
- Sergi, B.S. (ed.): *Tech, Smart Cities, and Regional Development in Contemporary Russia*. Emerald Publishing Limited, Bingley (2019)
- Sergi, B.S., Popkova, E.G., Bogoviz, A.V., Litvinova, T.N.: *Understanding Industry 4.0: AI, the Internet of Things, and the Future of Work*. Emerald Publishing Limited, Bingley (2019)
- Stolyarov, N.O., Petrenko, E.S., Serova, O.A., Umuralieva, A.S.: The digital reality of the modern economy: new actors and new decision-making logic. *Lecture Notes in Networks and Systems*, vol. 87, pp. 882–888 (2020)
- UNDP: Human development report 2019 (2020). <http://hdr.undp.org/sites/default/files/hdr2019.pdf>. Accessed 06 Jan 2020

# Conclusion

The scientific and technological revolution of the late 20th century - early 21st century is logical, its stages are interrelated in a cohesive way, but its consequences are unpredictable. On the one hand, formation of the digital economy will solve a large variety of topical issues of mankind. Digital medicine will ensure complete coverage of world population with medical services, early disease detecting and curing most ailments; high-tech production sector will make it possible to produce goods and services for meeting even the most exclusive needs, and the innovative approach to farming will make it possible to solve the problem of world hunger.

On the other hand, the transition to Industry 4.0 implies new risks and threats. They are safety-related, as it is necessary to ensure safety in a new environment – digital environment, and by means of advanced – “intelligent” technologies, with social adaptation to permanent changes, as well as finding ways to maintain the balance and stability of economic systems in a global economic environment characterized by unprecedented dynamism.

Scenarios of development of the digital economy and Industry 4.0 described in the book will make it possible to reduce the degree of uncertainty and prepare for the upcoming changes in a timely manner, and the proposed theoretical and practical recommendations will make it possible to make the scientific and technological revolution controllable and harmonize it in accordance with development priorities of mankind.

Finally, regard must be paid to the fact that, although the book answers many topical questions of society and the economy, new topical issues were discovered as a result of studies. In particular, the established unidimensional view of the scientific and technological progress gives rise to the fair scientific criticism and needs enhanced reasoning or revision.

Economic systems are characterized by cyclic development. Therefore, the isolated consideration of the Fourth Industrial Revolution leads to its limited interpretation and prevents us from assessing its long-range consequences. Based on the fundamental principles and empirical observations of the Theory of Business Cycles, it appears that the current stage of development of the world economic

system associated with the Fourth Industrial Revolution is the stage of expansion of the long-wave cycle (conjuncture cycles also known as K-waves, developed by N. Kondratiev).

Hence, a new world crisis should become a logical end of the revolution in the long-term. Searching for its sources – social, anthropogenic and environmental – currently deserves high attention for preventing the probable future crisis. It is recommended to dedicate further research to this scientific inquiry.

# Author Index

## A

Abashidze, A. Kh., 1068  
Abbasova, O. I., 22  
Abdyraeva, Gulmira R., 932  
Adarina, Raisa T., 387  
Adinyayev, Semyon I., 1307  
Adzhikova, Altynay S., 150  
Agibalova, Elena N., 160, 171  
Akhidzhak, Bella N., 3  
Akhidzhakova, Marjet P., 3  
Akimova, O. E., 103  
Aksenova, Marina V., 725  
Akshalova, R. D., 1068  
Aleksandrova, Larisa S., 1596  
Aleksieienko-Lemovska, Lyudmila V., 731  
Alieva, Natalya Z., 637  
Alpidovskaya, Marina, 427  
Amirova, Aliya A., 835  
Anarbaeva, G., 707  
Andreeva, Elena I., 1346  
Andryashina, Natalia S., 113, 122, 131, 140,  
280, 289, 1326  
Anikin, Boris A., 1664  
Anikin, Oleg B., 1664  
Antamoshkina, E. N., 1173  
Antonyan, Elena A., 1136  
Arkhangelskaya, Lyubov Yu., 1335  
Artemenko, Dmitry A., 1076  
Artemyeva, Yu. A., 1119  
Arutyunova, Asya, 841  
Arutyunova, Asya E., 486  
Astafyev, Igor V., 884  
Astakhin, Alexander S., 476  
Avkopashvili, Pavel T., 1360, 1369

## B

Bagdasarian, Irina S., 296, 740  
Baghdasarian, Irina S., 40  
Bakhtiyarova, Lyudmila N., 610  
Balabanova, D. K., 892  
Balaeva, Svetlana I., 410  
Bannikova, Natalia V., 181  
Bardulin, Evgeny N., 12  
Barinov, E. E., 715  
Barinov, Valery N., 1566  
Baum, George A., 866  
Bazieva, Aliya M., 303  
Bedelova, Nurgul, 321  
Beilina, Anna F., 476  
Belousova, A. A., 1089  
Berdyshev, Aleksandr V., 1596  
Berezko, Vladimir E., 449  
Berlyavskiy, L. G., 715  
Bezhovets, Andrey A., 1440  
Blieva, Madina V., 1431  
Bodiako, Anna V., 337  
Bogdan, Varvara V., 1166  
Boldyrev, Roman Yu., 83  
Boldyreva, Slavyana Yu., 83  
Bolshunov, Andrey Y., 851, 859  
Bolshunova, Sofiya A., 851, 859  
Bondarenko, Alexander A., 314  
Bondarenko, Dmitriy V., 1250  
Borodin, Vladimir A., 1369  
Borubaeva, Gulbara N., 303  
Boyko, Maria V., 776  
Bryzhinskaya, Anastasia E., 671  
Bukaleroval, Liudmila A., 976, 987, 1242  
Bukaleroval, Ludmila A., 1259

Bukalerovalyudmila A., 1307  
 Bulyga, Roman P., 314  
 Bunich, Galina A., 1224  
 Butakova, N. A., 1018  
 Butova, Larisa M., 476

## C

Chaplya, Vasilij V., 907  
 Charchoglyan, Tatyana G., 725  
 Chelnokova, Elena A., 265  
 Chelysheva, El'vira, 1707  
 Chernakov, V. O., 1002  
 Chistyakov, Aleksei A., 1277  
 Chistyakov, Kirill A., 1277  
 Chubaevalyudmila N., 695

## D

Danilina, Larisa Ev., 1335  
 Dashkova, Elena V., 637  
 Dedov, Sergey V., 213  
 Demicheva, Tatyana N., 792  
 Denisov, Petr V., 1588  
 Denisova, Irina P., 792, 1588  
 Diatlov, G. A., 1056  
 Dmitrieva, Elena E., 233  
 Dolzhikov, Piotr K., 1250  
 Dolzhikova, Anzhela V., 976  
 Dovgotko, Natalia, 435  
 Drobysheshevskaya, Larisa N., 907  
 Drozd, M. G., 826  
 Druzhilovskaya, Emilia S., 1588  
 Druzhilovskaya, Tatyana Y., 1588  
 Dubova, Yulia I., 647  
 Dubovitski, Alexander A., 486  
 Dubovskaya, Olga, 689  
 Dushakova, Lesya A., 1036  
 Dzakhmisheva, Irina Sh., 1420  
 Dzhioev, Vladimir A., 459  
 Dzobelova, Valentina B., 1633

## E

Egorov, Evgeniy E., 782  
 Egorova, Anastasia O., 140  
 Epinina, Veronika S., 12  
 Ergardt, Olga I., 1431  
 Ermakova, E. P., 1119  
 Ermatova, Asylbu I., 303  
 Evnevich, Maria A., 1076

## F

Fadeev, Vladimir A., 1217  
 Falker, Marie-Christin, 1518, 1532, 1551  
 Fedotova, Gilyan V., 12  
 Fetisov, Sergey D., 866

Filatova, Olga N., 925  
 Filimonenko, Irina V., 40, 740, 764  
 Filippov, Vladimir M., 1286  
 Frolova, E. E., 1119

## G

Gaisha, Ol'ga D., 459  
 Galas, Marina L., 1604  
 Galazova, Svetlana S., 1094  
 Garin, Alexander P., 113, 122, 280, 289, 1326  
 Garina, Ekaterina P., 113, 122, 131, 140, 280, 289, 1326  
 Gashimov, Elchin A., 3  
 Gavrilova, Julia A., 1136  
 Gazukina, Julia G., 1456  
 Gipaevalyudmila V., 12  
 Golovastova, Yulia A., 1277  
 Golubeva, Olga V., 808  
 Gorbacheva, Natalya, 755  
 Gorevoy, Evgenij D., 553  
 Gorlov, Ivan F., 1317  
 Gorlova, Elena A., 213  
 Gorokhova, Svetlana S., 1102  
 Gracheva, Marina V., 459  
 Grechkina, O. V., 1026  
 Grinevich, A. V., 226  
 Grundel, Larisa P., 1642  
 Gubernatorova, Natalia N., 497  
 Gubin, Alexander V., 1670  
 Gubkina, Elena V., 1464  
 Gudkova, Tatiana, 418  
 Gurba, Vladimir N., 1076  
 Gurnovich, Tatyana G., 866  
 Guseva, Ludmila V., 395, 776

## H

Haabazoka, Lubinda, 1716  
 Handema, Macmillan, 1716

## I

Ignatyeva, Ekaterina V., 725  
 Ilovaysky, Igor B., 160  
 Imomnazarova, Khosiyat S., 1346  
 Isokov, Anvarjon A., 1633  
 Ivanov, Aleksey A., 49, 58  
 Ivanov, Alexey Y., 49  
 Ivanov, D. V., 1112  
 Ivanova, Nadezhda D., 49, 58  
 Ivanova, T. N., 1018  
 Ivanova, Tatyana, 755  
 Ivushkina, Elena B., 637  
 Izmodenov, Andrei K., 571

## K

Kaiymova, Parida M., 969  
 Kamardinova, Uyalkhan N., 969  
 Kamolov, Sergei G., 467  
 Kantsalieva, Zalina L., 1440  
 Karamova, Olga V., 1143  
 Karataev, Evgeny M., 1402  
 Karimov, S., 707  
 Karpuhin, Dmitry V., 987  
 Karpunina, Evgeniya K., 213, 476, 486, 497  
 Kayl, Yanina Y., 160  
 Kecherukov, Rashid K., 1217  
 Ketko, N. V., 103  
 Khachatryan, Askhik A., 257  
 Khachmafova, Zaineta R., 3  
 Khakhaleva, E. V., 1011  
 Khasnutdinov, Renat R., 1266, 1294  
 Kholod, Marina V., 213  
 Kim, Olga M., 776  
 Kirilenko, V. S., 1046  
 Kirilin, Kirill A., 1449  
 Kirizleyeva, Alisa S., 509  
 Kirpicheva, Maria A., 257  
 Kiseleva, Ekaterina V., 875  
 Kletskova, Elena V., 329, 410, 943, 1411  
 Klimova, Oksana V., 1473  
 Klueva, Victoria A., 520, 530  
 Klyueva, Marina I., 799  
 Kobleva, M. M., 996  
 Kočišová, Kristína, 1483  
 Kolesnichenko, Elena A., 272  
 Kolesov, Kirill I., 58  
 Komlatsky, Vasily I., 1317  
 Koncheva, Valentina A., 1152  
 Kopylov, S. M., 226  
 Kornitskaya, Oksana V., 1566  
 Koroleva, Elena V., 395  
 Korolevskaya, O. I., 1046  
 Korostin, Sergey A., 1234  
 Korshunova, Tatuana N., 1588  
 Korunencko, E. Y., 996  
 Kostikova, A. V., 103  
 Kosykh, A. A., 1002  
 Kovalenko, Sergey A., 1286  
 Kovalenko, Svetlana A., 907  
 Kovaleva, N. A., 1681  
 Kozhanova, Darima A., 1440, 1449  
 Kozhevina, Olga V., 520, 530, 1182  
 Kozlova, Elena P., 140, 150, 265  
 Krasnov, Evgeniy V., 314  
 Kravchenko, E. V., 376  
 Kriulina, Alexandra, 418  
 Krotenko, Tatiana Yu., 561  
 Krotova, Tatyana, 657

Kruchinina, Galina A., 395  
 Krupoderova, Elena P., 602, 610  
 Krupoderova, Klimentina R., 602, 610  
 Kulagina, Julia A., 808  
 Kulikova, A. A., 1056  
 Kulueva, Chinara R., 932  
 Kurdyumov, Alexander V., 571  
 Kusakina, Olga, 435  
 Kushnir, Dariya Yu., 93  
 Kushnir, Irina B., 637  
 Kutepov, Maksim M., 65  
 Kuternin, Mikhail I., 1653  
 Kutsuri, Georgiy N., 1094  
 Kuttubaev, Ayapbek A., 387  
 Kuttubaeva, Toskanay A., 1473  
 Kuzmin, Mikhail D., 205  
 Kuznetsov, Nikolay V., 593  
 Kuznetsov, Victor P., 49, 113, 131, 150, 289  
 Kuznetsova, Svetlana N., 122, 265, 280  
 Kuznetsova, Valentina V., 239

## L

Lan, Luo, 1061  
 Lapshova, Anna V., 808  
 Lapushinskaya, Galina K., 486  
 Lebedeva, Tatyana E., 782  
 Leontiev, Nikolay Ya., 49, 58  
 Lizunova, Nina M., 74, 540  
 Loguinov, Boris B., 1664  
 Lupacheva, Svetlana V., 486  
 Lyovkina, Marina N., 1386  
 Lyulyaeva, Natalya A., 799

## M

Makhalin, Viktor N., 1464  
 Makhalina, Oxana M., 1449  
 Makhamatov, Tahir M., 816  
 Makhamatov, Timur T., 816  
 Makhamatova, Saida T., 816  
 Maltsev, Vladimir V., 249  
 Malysheva, Matrena S., 619  
 Malyuga, A. L., 376  
 Mamaeva, Ekaterina N., 875  
 Mamatova, A. A., 960  
 Manukyan, M. A., 715  
 Mapaeva, Nurzhama A., 969  
 Marchenkova, Liliya M., 625  
 Marinina, Julia A., 395  
 Martseva, Tatiana G., 915  
 Matveevskiy, Sergey S., 1596  
 Matvienko, Karina V., 1572  
 Medvedeva, Elena Y., 233  
 Melekhina, Tatiana L., 30  
 Melekhova, Kseniya A., 387, 1456

Melikhova, E. V., 1173  
 Meliksetyan, S. N., 376  
 Melnikova, Yuliya V., 952  
 Merdesheva, Elena V., 1360  
 Merkuryev, Vladimir V., 1402  
 Merkushova, Olesya V., 987  
 Merzlyakova, Anna V., 725  
 Meskhi, B. Ch., 826  
 Mezhev, Stepan I., 345  
 Mikhaleva, Maria A., 1688  
 Mikhcheva, Victoria I., 1354  
 Mikhnenko, Tat'yana, 1707  
 Milkina, Elizaveta A., 1572  
 Milova, Irina E., 1266, 1294  
 Mishchenko, Vitaliy V., 1394  
 Mishulin, Georgy M., 1670  
 Mizikovskiy, Igor E., 65  
 Mogilevsky, Stanislav D., 1036  
 Morozova, Irina M., 808  
 Mosolov, Aleksander A., 1317  
 Mosolova, Daria A., 1317  
 Muzulmanov, M. U., 960

## N

Nasonova, Ludmila I., 952  
 Nasretdinova, N. F., 1002  
 Naumets, Vladimir, 689  
 Naurzalieva, Saule M., 976, 1250  
 Nazarova, Natalia A., 1642  
 Nekhvyadovich, Larisa I., 1369, 1464  
 Nikolaichuk, Olga A., 74, 540  
 Novoselova, Natalia N., 1217  
 Novruzova, Oxana B., 553, 1166  
 Nuradinov, Sh. M., 715

## O

Obukhova, Larisa Yu., 74, 540  
 Odintsov, Stanislav V., 1152  
 Okolelova, Ella Y., 1566  
 Okunkova, Elena A., 497  
 Oladyshkina, Anastasia A., 395  
 Olisaeva, Alisa V., 1633  
 Olkhina, Elena A., 233  
 Olyanitch, Andrey V., 3  
 Orekhovskaya, Natalia A., 93  
 Osipov, Danila D., 1266, 1294  
 Osmonov, Zairbek A., 303  
 Ostroushko, Alexander V., 976, 987  
 Ovsyannikov, V. A., 996

## P

Pakhomov, Nikolay N., 272  
 Parshikova, Galina Yu., 1653

Pashkovskaya, I. V., 1681  
 Pavlenkov, Michael N., 581  
 Pavlova, Irina V., 520, 530  
 Pavlova, Maria B., 619  
 Perfil'yev, Alexey A., 1653  
 Perova, Tatyana A., 799  
 Petrakova, Anna S., 915  
 Petrasheva, N. V., 1056  
 Petrov, Alexey Y., 925  
 Petrov, Yury N., 925  
 Petrova, Elena A., 402, 1378  
 Petrova, Nina S., 925  
 Petyukova, Oksana N., 1159, 1688  
 Piterskaya, Lyudmila Yu., 866  
 Plekhanova, Anna F., 58  
 Pleschenko, T. V., 1173  
 Pobedushkina, Victoria A., 30  
 Podroykin, I. A., 996  
 Pogrebinskaya, Ekaterina A., 239  
 Ponachugin, Alexander V., 602, 610  
 Ponomarev, Sergey V., 213  
 Ponomareva, Svetlana V., 314, 826  
 Popova, Anna V., 1102  
 Popova, Ekaterina D., 907  
 Popova, G. V., 376  
 Potashnik, Yaroslav S., 131, 265  
 Pozharskiy, D. V., 1002  
 Prasolov, Victor N., 1335  
 Prokhorova, Maria P., 782  
 Pronina, Natalia S., 776, 799  
 Pronina, Yuliya O., 553, 1166  
 Protopopova, O. V., 1119  
 Pupynina, Elena G., 181  
 Putilo, Natalia V., 1102  
 Pyanova, Nataliya V., 625

## R

Radyukova, Yana Y., 272  
 Rayimbaev, Chatkalbay K., 1581  
 Rayimberdieva, Zhannat K., 932  
 Raznova, Natalia V., 40, 764  
 Reimov, Rinat Zh., 581  
 Robets, Darya S., 1420  
 Rogachev, A. F., 1173  
 Rogulenko, Tatiana M., 337  
 Romanova, Marina S., 150  
 Romanovskaya, Elena V., 113, 122, 131, 140, 280, 289  
 Rudakova, Oksana Yu., 1182  
 Rudakova, Tatyana A., 1182  
 Rumyantseva, Irina A., 561  
 Rusina, Anastasia N., 40  
 Rusina, Anastasiya N., 740, 764



Ruzanov, Pavel A., 602  
 Ryabkova, Yuliya V., 725  
 Ryazanova, Galina N., 357  
 Rybakov, Oleg Y., 1136  
 Rybina, Galina A., 239

## S

Safonenkov, P. N., 1026  
 Saidmukhtorov, A. A., 1195  
 Salienko, Natalia V., 520, 530  
 Salin, Victor N., 1335  
 Saltanova, Tat'yana, 1707  
 Samerkhanova, Elvira K., 602, 610  
 Samodelov, Anton N., 637  
 Samorodova, Elena M., 625  
 Samsonova, Irina V., 619  
 Sanginova, Lola D., 1094  
 Sannikova, Inna N., 1182  
 Santalova, M. S., 892  
 Sapfirova, A. A., 1011  
 Sapparov, Rinat R., 1242  
 Savtsova, Anna V., 272  
 Sazanova, Ekaterina V., 497  
 Sazanova, Svetlana L., 357, 593  
 Seifieva, Elena N., 915  
 Seitov, Bolotbek M., 1326  
 Seitova, Kanikey B., 932  
 Seitova, Zhibek B., 1326  
 Semakhin, Evgeny A., 150  
 Semenova, Elena M., 365  
 Semenova, Lyubov A., 619  
 Semenova, Nataliya S., 875  
 Seregina, Tatiana N., 93  
 Sergeeva, Alexandra E., 1143  
 Sevalnev, Viacheslav V., 1205  
 Shamanina, Ellina A., 671  
 Shamov, Aleksandr N., 776  
 Shamshidinov, Uchkunbek T., 1581  
 Sharueva, Natalya V., 1136  
 Shchemelev, S. N., 22  
 Sheina, Ekaterina G., 571  
 Shelepova, Nataliya, 1707  
 Shergunova, Elena A., 553  
 Shilov, Michael V., 792  
 Shkunova, Anzhelika A., 782  
 Shmaliy, Oksana V., 1026, 1036  
 Shokhnekh, Anna V., 952  
 Shpilevskaya, Elena V., 65  
 Shulgin, Alexey V., 1566  
 Shumskaia, Ekaterina I., 205  
 Shupletsova, Yulia I., 1102  
 Shvakov, Evgeny E., 1378, 1386  
 Shvakova, Olga N., 1456

Sidorova, Daria G., 808  
 Sidorova, Sofia A., 249  
 Silaev, Alexander A., 1653  
 Simonova, Maria A., 1286  
 Simonova, Mariya A., 1250  
 Sinyakov, Yuri V., 337  
 Sirotkin, Artyom A., 65  
 Sizov, Oleg V., 625  
 Sizova, Irina Yu., 365  
 Skalkin, Vladimir V., 249  
 Skiter, N. N., 103  
 Skripova, Irina I., 1259  
 Skvortsova, T. A., 1046  
 Slepakov, Sergey S., 1217  
 Smagina, Aleksandra A., 467  
 Soklakova, I. V., 892  
 Sokolov, Dmitry P., 884  
 Solntsev, A. M., 1068  
 Solntseva, Oksana G., 194  
 Sorokin, Aleksei M., 1346  
 Sotnikova, Elena A., 365  
 Spektor, L. A., 1056  
 Starikova, Evgeniya A., 695  
 Starozhuk, Evgeny A., 520, 530  
 Stepanova, Tamara V., 12  
 Stompeleva, Ekaterina, 427  
 Stroiteleva, Tamara G., 402, 410  
 Sukhova, Maria G., 1386  
 Sumarovkov, Evgeny V., 1143  
 Surat, V. I., 892  
 Syrova, Nadezhda V., 925

## T

Tamakhina, Aida Ya., 345  
 Tashkulova, Gulzat K., 329, 943  
 Teichmann, Fabian, 1518, 1532, 1551  
 Telyatnikova, Victoria S., 952  
 Tenishchev, Alexander V., 181  
 Ternovskaya, Helena P., 1697  
 Tishchenko, Evgeniya S., 497  
 Tishkina, Nadezhda P., 239  
 Titova, Olga V., 1360, 1402, 1411, 1420, 1473  
 Tolstykh, Tatyana O., 65  
 Torchinova, Oksana V., 1633  
 Trachenko, Marina B., 459  
 Trifonov, Pavel V., 257  
 Trubina, Marina V., 1152  
 Trufanova, Svetlana A., 476  
 Trukhina, Natalia I., 1566  
 Trunova, E. V., 1046  
 Trunzevskiy, Uriy V., 1205  
 Tsapina, Tatyana N., 782  
 Tsarekova, Violetta S., 249

Tsepova, Ekaterina A., [1612](#)  
Tshibola, Aimée M. L., [1159](#)  
Tsirin, Artem M., [1205](#)  
Tsvetkova, Irina, [755](#)  
Tsymbalov, Sergey D., [265](#)  
Turovsky, Alexander A., [337](#)  
Tychina, Olga L., [83](#)  
Tyurikov, Alexander G., [851](#), [859](#)

## U

Ugnich, E. A., [826](#)  
Umuralieva, Aida S., [303](#)  
Uromova, Svetlana E., [233](#)  
Usanova, Viktoria A., [160](#)  
Usvyat, Nadezhda D., [1182](#)  
Uzakbaeva, Aynura S., [932](#)

## V

Vakhabova, Asiyat A., [83](#)  
Valencyk, Radim, [357](#)  
Vanin, Vitaly V., [1036](#)  
Vasilenko, Aleksandra S., [1286](#)  
Vasilenko, Alexandra S., [1250](#), [1307](#)  
Vasilieva, Zoya A., [740](#), [764](#)  
Vaytsekhovskaya, Svetlana S., [181](#)  
Velikanov, V. V., [103](#)  
Veselko, Alena A., [1346](#)  
Voblaya, Irina N., [915](#)  
Volkova, Tatyana V., [1627](#)  
Volkova, V. V., [1011](#)  
Vorobyova, Natalya V., [181](#)  
Vorobyova, Victoria V., [1411](#)  
Vorotinceva, Tatyana M., [1346](#)  
Vukovich, Galina G., [1431](#)

## Y

Yaitskaya, Elena A., [1394](#)  
Yakushina, Tatyana A., [1394](#)  
Yarygina, Irina Z., [1224](#)  
Yastrebov, Oleg A., [1242](#)  
Yavorskiy, Maxim A., [1266](#), [1294](#)  
Yerznkyan, Bagrat A., [357](#)  
Yuan, Sisheng, [1697](#)  
Yungblyudt, Sergey V., [345](#), [402](#)  
Yusupov, Alisher S., [1581](#)  
Yzabekova, Dinara A., [969](#)

## Z

Zakharov, Aleksandr V., [365](#)  
Zakharova, Olga V., [1596](#)  
Zamaraeva, Elena I., [93](#)  
Zamyatina, Natalia A., [194](#)  
Zavyalova, Elena B., [205](#), [657](#), [695](#)  
Zbinyakova, Elena A., [625](#)  
Zenchenko, Svetlana V., [272](#)  
Zheltnina, Evgeniya, [755](#)  
Zhernakova, Marina B., [561](#)  
Zhiglyayeva, Anastasia V., [1224](#)  
Zhilkina, Anna N., [459](#)  
Zhulina, Elena V., [233](#)  
Zhuravleva, Irina A., [1642](#)  
Zimina, Maria V., [799](#)  
Zlobina, Elena Yu., [1317](#)  
Zolotov, Aleksandr V., [792](#)  
Zolotova, Marina V., [792](#)  
Zubach, A. V., [1026](#)  
Zulpukarov, Kapar Z., [969](#)  
Zuluyev, Bekmurza, [960](#)  
Zviagintceva, Yuliia A., [365](#)  
Zvonova, Elena A., [1224](#)