

BOOK REVIEW

DIGITALIZATION OF ECONOMY: FROM NEO-KEYNESIANISM TO BLOCKCHAIN IN HEALTH CARE

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Review of a book

Deveraz, T., Leitão J., & Sarygulov A. (2021). *The Economics of Digital Transformation and Industrial Dynamics*. Springer. <https://doi.org/10.1007/978-3-030-59959-1>

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РЕЦЕНЗИЯ НА КНИГУ

ЦИФРОВИЗАЦИЯ ЭКОНОМИКИ: ОТ НЕОКЕЙНСИАНИЗМА ДО БЛОКЧЕЙНА В ЗДРАВООХРАНЕНИИ

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The book is published in the series *Studies on Entrepreneurship, Structural Change* and is devoted to the study of IT development and its impact on the digital transformation of the economy in modern conditions. The multinational team of authors comprises representatives of theoretical and applied scientific fields under the editorship of Tesseleno Devezas, João Leitão, and Askar Sarygulov.

Digital transformation and the rapid development of big data, ML, AI under present-day conditions concern all aspects of the development of economy and society. They alter the development of markets and industries, management techniques and decision-making methods. Many of the cutting-edge research reports are devoted to this.

In the monograph, the authors present several arguments for adjusting some of the tenets of economic theory, delve into the development of innovative IT solutions and their impact on the labor market, income, production, consumption and other economic factors. The book could be divided structurally into several generalized chapters. The author of the review conditionally divides it into three parts: theoretical, methodological and applied research. According to editors, ‘It consists of providing innovative answers to still unexplored analysis topics, namely: (1) the socio-economic changes associated with the digital transformation of production systems; (2) the impacts of digital transformation on the sustainable functioning of socio-economic and environmental systems; (3) the adoption of intelligent/learning systems affecting the substitution of human labor force and smart digital management/security of cities, and (4) the type of materials and energy innovations leading to sustainable change’.

The book consists of 15 articles. The theoretical part thereof is aimed at drawing readers’ attention to the contribution to academic science. It contributes to the research in the area.

Having conducted research with the use of mathematical apparatus under the headline “Social and Economic Consequences of Large-scale Digitization and Robotization of the Modern Economy”, Askar Akaev, Andrey Rudskoy, and Tesseleno Devezas expect such labor market risks as a change in the employment structure, a dramatic decline in middle class bringing it on the verge of extinction, higher wages and falling incomes by 2050.

In research work headlined “Revisited Economic Theory or How to Describe the Processes of Disequilibrium and Instability of Modern Economic Systems” Askar Akaev and Viktor Sadovnichii devised nonlinear mathematical models, that accurately describe the Schumpeter-Kondratiev theory. These models can be used to calculate both long-term projected trajectories of the economic growth and cyclical fluctuations. The research reveals that the share of digital economy will grow. Developing the Keynes-Minsky theory, the authors propose to adjust the policy of public administration and make management of capital markets, which are effectively unstable, the focal point of central bankers.

Amid growing income disparity, the authors of the research article “Technological Development: Models of Economic Growth and Distribution of Income” Askar Akaev, Askar Sarygulov, and Valentin Sokolov make use of mathematical modeling and propose a modified neoclassical model of economic growth, which takes into account new empirical patterns. The authors prove that if state institutions do not interfere with existing trends, the rise in inequality will persist, since there are no endogenous economic mechanisms that could limit this process.

An empirical study of data on the US economy in the work “Breakthrough Technologies and Labor Market Transformation: How It Works and Some Evidence from the Economies of Developed Countries” by Elena Gorbashko, Irina Golovtsova, Dmitry Desyatko, and Viktoriya Rappgof shows that job cuts in the industrial sector and job gains in the service sector are a long-term and sustainable trend. These structural transformation processes are not the result of market mechanisms alone.

State programs are needed to develop and finance personnel training and retraining to mitigate the consequences of profound structural changes in the labor market.

Askar Akaev, Andrey Rudskoy, and Tesseleno Devezas in the article “Technological Substitution of Jobs in the Digital Economy and Shift in Labor Demand Towards Advanced Qualifications” conduct mathematical modeling to identify the distribution of labor resources by skill level, as well as the distribution of the probability curve of technological displacement of labour depending on the skill level. This made it possible to calculate the actual share of low-, medium- and highly skilled workers before and after the digital transformation of the economy. The study shows that the optimum wage growth of highly skilled workers should be 7% per annum and double that in 10 years.

Recent changes in oil prices in 2021 have revived interest in oil shocks that affect international stock markets and are examined in the research paper “Oil Shocks and Stock Market Performance: Evidence from the Euro Zone and the USA”. The authors Joao Leitaο and Joaquim Ferreira calculate a VAR structural model to assess the impact of BRENT and WTI crude oil prices on the values of the Dow Jones, DAX, CAC, Athens Composite and PSI20 stock indices.

Maksim Balashov, Anton Kiselev, and Alena Kuryleva as part of the study “Reinforcement Learning Approach for Dynamic Pricing” try to solve the problem of dynamic pricing by maximizing profits from the sale of a specific product for automatic gas stations. To address this issue, the authors deem it appropriate to use machine learning methods that adapt to the environment, one of which being reinforcement learning (RL).

Examining the problem of creating the concept of cyber-physical systems in the research “Convergent Evolution of IT Security Paradigm: From Access Control to Cyber-Defense”, Dmitry Zegzhda suggests we understand the security of cyber-physical systems as maintaining the stable functioning of a cyber-physical system, taking into account the targeted detrimental impact on its information components. The article describes the transition process from access control to cybersecurity for the full protection of cyber-physical systems.

Continuing the topic of cyber threats in the work “AI Methods for Neutralizing Cyber Threats at Unmanned Vehicular Ecosystem of Smart City”, the authors Maxim Kalinin, Vasiliy Krundyshev, and Dmitry Zegzhda suggest using new AI methods (swarm algorithms and neural networks) to forestall cyber threats in V2X digital infrastructures and the results of experiments obtained using supercomputer modeling in intelligent environments such as IoT, IIoT, WSN, m2m networks.

Elaborating on cybersecurity in the research paper “Cybersecurity and Control Sustainability in Digital Economy and Advanced Production” Dmitry Zegzhda, Evgeny Pavlenko, and Anna Shtyrkina prove that an important feature of modern digital systems is the priority of ensuring the correct operation of the entire system, rather than the security of its individual components. The proposed approach is aimed at ensuring cybersecurity and cyberstability based on self-adaptation of the system to operating conditions.

In the article “Blockchain for Cybersecurity of Government E-Services: Decentralized Architecture Benefits and Challenges” Alexey Busygin and Artem Konoplev dissect the issue of different approaches to the creation of public e-services. The study reveals financial, operational and security-related advantages of the decentralized approach compared to the centralized one and identifies the pivotal problems of cybersecurity. The authors propose to use blockchain technologies in order to solve the problems in question.

The topic of energy problems is presented in the book at both sectoral and microeconomic levels. Yuri Nurulin, Inga Skvortsova, and Elena Vinogradova in the article “Green Energy Markets: Current Gaps and Development Perspectives in the Russian Federation” consider this pressing issue for

modern Russia in terms of the Doing Business rating. The authors carried out a comparative analysis of electric networks and their capabilities in the world and Russian economy. This study also examines the Smart Grid concept with a view to finding a way to ramp up network capacity.

In the article “Energy Efficiency in Urban Districts: Case from Polytechnic University” Yuri Nurulin, Vitaliy Sergeev, Inga Skvortsova, and Olga Kaltchenko consider an Energy Improvement District and as a real estate object in which energy efficiency measures are taken. This example can be replicated when it comes to private, state and regional real estate objects, which is important for stakeholders of territorial entities of St. Petersburg.

The article “An Architectural Approach to Managing the Digital Transformation of a Medical Organization” by Igor Ilin, Oksana Iliashenko, and Victoria Iliashenko revolves around the development of a medical organization’s business model in the context of digitalization. The authors propose to use the architectural model of the upper level to implement new IT technologies and enhance the efficiency of health departments and in order to adapt the existing digital services in such departments.

Identifying the features of the development of commodity markets in the study headlined “Aluminum Production and Aviation: An Interesting Case of an Interwoven Rebound Effect in a Digital Transforming World” Tessaleno Devezas and Hugo Ruão analyze the dynamics of production and consumption of resources, including aluminum over the past 30 years. Econometric instruments are widely used to identify the impact of various factors (the Chinese market, ecology, scrap metal production, etc.) on aluminum consumption in space, aerospace and other industries. Resorting to forecast models for the period up to 2050, the authors conclude that under the influence of digitalization the amount of aluminum processed from scrap will suffice to produce aircraft.

Therefore, the book under review *The Economics of Digital Transformation and Industrial Dynamics* is a fundamental academic work. Even though it lacks a distinct structure, the general purpose of this book is to solve the problems inherent in IT development, as well as to implement information technologies at macro, meso and micro levels, given the call for expanding the foundations of economic theory. The book also sheds light on the quite relevant problem of the need to restructure enterprises and markets of goods and services in the context of digitalization tools, e-services, and IT on the whole. Such tools are being developed and improved in general. They have a practical meaning, for instance, in the energy sector and the healthcare system.

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