

Chapter 29

Emergence of Industry 4.0 Technologies: Leapfrogging Opportunity for the Russian Federation

Leyla A. Gamidullaeva

Penza State University, Russia

Sergey M. Vasin

Penza State University, Russia

Elena V. Shkarupeta

Voronezh State Technical University, Russia

Tatyana O. Tolstykh

 <https://orcid.org/0000-0002-4386-9684>

NUST MISIS, Russia

Alexey G. Finogeev

 <https://orcid.org/0000-0002-4777-3364>

Penza State University, Russia

Galina V. Surovitskaya

*K. G. Razumovsky Moscow State University of
Technologies and Management, Russia*

Sergey Kanarev

Penza State University, Russia

ABSTRACT

Innovations in the modern world are not simply connected with the opportunities of digital technologies but also largely based on them. This is exactly why the full-fledged successive industrial sector's digitization will become a platform for qualitative changes of the economy and long-term opportunities. Thus, the transition to digital technologies is inevitable, but from another perspective, this very transition cannot be the absolute goal. In this chapter, the authors aimed at providing a better understanding for Industry 4.0 concept and its application benefits for Russia. The main problem is how the Russian Federation acts against the economically developed countries, which are the creators of Industry 4.0. This chapter mainly focuses on presenting the authors' views on how to sustain and increase competitive advantage of the Russian Federation by catching and implementing Industry 4.0. With Industry 4.0, Russian Federation gets a bigger share of the world manufacturing value chain.

DOI: 10.4018/978-1-7998-7297-9.ch029

INTRODUCTION

Recent trends of globalization are faced with the need to meet the constant global demand for new production technologies. To overcome this problem, the industry must ensure sustainable production. It is expected that, within the framework of the fourth stage of industrialization, a new approach in the industry 4.0 will ensure a greater integration of information and communication technologies (ICT) with industry. It leads to the intelligent and self-organized industry as well as, more flexible and efficient industrial goods.

During the first industrial revolution with the help of water and steam, the production was mechanized. The main driver of the second industrial revolution was electricity, which helped create mass production. At the center of the third revolution was electronics and information technologies that automated production. Due to the third industrial revolution there began a wide use of information technologies in the industry. The industry 4.0 is related with the development of Cyber Physical Systems.

The fourth industrial revolution is the blending of technologies of the physical, digital and biological world, which creates new opportunities and affects political, social and economic systems.

The fourth industrial revolution fundamentally transforms modern production, thanks to new technological achievements, including digitalization and robotization, artificial intelligence and the Internet of things (IoT), new materials and biotechnology. Due to these changes, production in developed countries again becomes the main source of prosperity and creation of new jobs.

In this chapter, the authors aimed at providing a better understanding for Industry 4.0 concept and its application benefits for Russia. The main problem is how the Russian Federation acts against the economically developed countries, which are the creators of Industry 4.0. This chapter mainly focuses on presenting the authors views on how to sustain and increase competitive advantage of the Russian Federation by catching and implementing Industry 4.0. With Industry 4.0, Russian Federation get a bigger share of the world manufacturing value chain.

BACKGROUND

By rapid implementation of information and communication technologies in manufacturing, the industrial processes becomes smart and enables mass customization. Many researches today are devoted to the investigation of the technologies and processes concerned with Industry 4.0 and its impact on economic development.

Industry 4.0 supposes the use of network approach that is based on the ability of creating smart products and components (*Kohlberg & Zühlke, 2015*). According to the authors (*Kohlberg & Zühlke, 2015*) Industry 4.0 enables new implementation areas through the potential of Industry 4.0 technologies such as powerful, flexible and affordable Cyber Physical Systems applications or extended applicability of Lean Production with various production types.

Bughin and Manyika (*2015*) assumed that the crucial impact factor in competition is related with the Internet of Things (IoT) which means that senior managers and company's members must act at the system level in order to be able to solve the challenges coming from the technological disruption.

Industry 4.0 technologies' application has proved their effectiveness in terms of increasing European firm's competitive advantage not only in manufacturing sectors, but also in service fields such as retail, healthcare, travel and financial services (*Piercy & Rich, 2009*).

28 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:
www.igi-global.com/chapter/emergence-of-industry-40-technologies/270313

Related Content

Securing Financial Inclusiveness Adoption of Blockchain FinTech Compliance

Heru Susanto, Fahmi Ibrahim, Rodiah, Didi Rosiyadi, Desi Setiana, Alifya Kayla Shafa Susanto, Nicolas Kusumaand Iwan Setiawan (2022). *FinTech Development for Financial Inclusiveness* (pp. 168-196).

www.irma-international.org/chapter/securing-financial-inclusiveness-adoption-of-blockchain-fintech-compliance/291872

Integrating Human and Artificial Intelligence Within Organizations: A Conceptual Framework Based on Artistry and Scientific HR Elements

Ekta Sinha (2023). *Managing Technology Integration for Human Resources in Industry 5.0* (pp. 48-67).

www.irma-international.org/chapter/integrating-human-and-artificial-intelligence-within-organizations/318296

Bibliometric Analysis of Supply Chain Digitalization

Laurence Saglietto, Jennifer Lazzeri Gracia-Campoand Federico Pigni (2022). *Handbook of Research on Digital Transformation Management and Tools* (pp. 489-530).

www.irma-international.org/chapter/bibliometric-analysis-of-supply-chain-digitalization/311940

Factors Affecting Customer Intentions Toward AI-Made Music: A Study With University Students in Japan

Bình NghiêPhú (2022). *Handbook of Research on Big Data, Green Growth, and Technology Disruption in Asian Companies and Societies* (pp. 195-220).

www.irma-international.org/chapter/factors-affecting-customer-intentions-toward-ai-made-music/290707

Investigating the Impact of the Internet of Things on the Probability of Entry in Export Market

Saeideh Samadzad (2024). *Building Smart and Sustainable Businesses With Transformative Technologies* (pp. 167-188).

www.irma-international.org/chapter/investigating-the-impact-of-the-internet-of-things-on-the-probability-of-entry-in-export-market/334690