UNDERSTANDING INDUSTRY 4.0

AI, THE INTERNET OF THINGS, AND THE FUTURE OF WORK

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ALEKSEI V. BOGOVIZ, AND TATIANA N. LITVINOVA

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Foreword

The global transition to the Fourth Industrial Revolution (Industry 4.0) is already underway. R&D on leading digital technologies is now conducted around the world. The essential novelty of these disparate technologies, aimed at revolutionizing cyber-physical systems, allows them to be classified together as "Industry 4.0." These technologies include the Internet of Things, the blockchain, 3D printing, technologies of virtual and alternate reality, technologies to manage Big Data processing, the use of artificial intelligence, and others.

The increasing accessibility of these leading technologies is stimulating the intensive development of hi-tech spheres of the economy. There is high demand for such breakthrough innovations from both private business and governments, which seek the common goal of an increase in the effectiveness and provision of high global competitiveness in the economy in the long-term. The inflow of public and private financing, as well as the rapid implementation of the results of R&D, ensures practical implementation. In a relatively short period of time (by 2025–2030) it will be possible to replace older technologies in all business processes and to form companies of a new type, which will be part of Industry 4.0.

Each of the three earlier industrial revolutions radically increased the effectiveness of economic activities, reducing marginal costs and raising labor efficiency, but at the same time led to negative social consequences – the growth of unemployment rates and the necessity for retraining and changes in the professions. The consumer and professional spheres of human society are closely interconnected. The advantages of mass accessibility and the emergence of new types of goods in the economy in the short- and even mid-term was outweighed by the drawbacks of complex social adaptations necessitated by changes in the labor market.

As the market for educational services cannot adapt instantaneously, creating new specialties and educational programs to retrain representatives of professions that disappear, and the labor market cannot offer a quick replacement for these lost professions, previous industrial revolutions led to long periods of social adaptation. The reduction of effective demand caused by professional categories losing their source of earned income hindered society from taking advantage of the mass production and accessibility of innovational goods – so the growth of living standards was only seen in the long-term (in 5–10 years).

The Fourth Industrial Revolution will not be an exception. On the contrary, unlike the earlier industrial revolutions, which envisaged the automatization of certain spheres of the economy or business processes, the new industrial

revolution will lead to almost complete automatization, which will influence almost all spheres and all business processes. This is a fact that leads us to expect deep transformational processes in the professional sphere of human society and the elevated risk of the emergence of a social crisis.

However, as of now, at the beginning of the Fourth Industrial Revolution, it is possible to prevent such a social crisis by implementing preventative measures to mitigate the effects of the rapid modernization of the professional sphere of human society. This book sets out to determine the most probable changes in the key spheres of the economy, to determine the most prestigious spheres and professions that will be effected, and to offer recommendations on the choices that public and private sector leaders should make to successfully master the disruptions ahead. We hope that this book will become a guide for all interested parties – job applicants, undergraduates, employees, employers, universities, and governments – and will allow for a reduction in the uncertainty of the coming changes and better strategies for adapting to these changes.

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