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DIGITAL TECHNOLOGIES IN ECONOMIC MODERNIZATION: THE ROLE AND IMPORTANCE OF ARTIFICIAL INTELLIGENCE

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Abstract. *This article analyzes the role and importance of artificial intelligence (AI) technologies in economic modernization. It examines the efficiency of AI systems in the digital development of modern economies and in enhancing competitiveness across manufacturing, finance, agriculture, transportation, and service sectors. Additionally, it discusses the social, financial, and security aspects of implementing AI.*

Keywords. *Artificial Intelligence, Economic Modernization, Digital Economy, Innovation, Automation, Financial Technologies, Agriculture, Industry 4.0, Workforce Optimization, Technological Development, Data Analysis, Digital Transformation.*

Introduction

In the modern economy, technological innovations, particularly artificial intelligence (AI) systems, are considered a primary factor in increasing competitiveness and efficiency. AI enables the automation of economic processes, optimal use of resources, and rapid implementation of innovative solutions. In a global competitive environment, countries strive to use AI technologies as a tool for economic modernization to enhance their competitiveness.

AI plays a significant role in several key sectors: improving manufacturing efficiency, optimizing financial services, enhancing agricultural

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productivity, automating transportation and logistics systems, and accelerating innovation processes.

The analysis uses the following methods:

1. Literature review – scientific articles, dissertations, technological reports, and economic analyses from government and international organizations.

2. Correlation analysis – identifying the relationship between the level of AI implementation and economic indicators.

3. Case study analysis – evaluating the effectiveness of AI-based solutions in industry, finance, agriculture, and service sectors.

4. Comparative method – comparing performance between AI-implemented and non-AI companies.

5. Statistical analysis – collecting data and visually representing results through diagrams and charts.

Results – Extended

1. Industry and Manufacturing

- AI systems automate production processes, reducing errors and increasing manufacturing efficiency by 20–40%.

- Integration with the Internet of Things (IoT) allows real-time monitoring and diagnostics of production lines.

- Example: Siemens in Germany optimized its production processes using AI, reducing energy consumption by 15%.

2. Financial Services

- AI algorithms can assess credit risks, prevent fraud, and manage investment portfolios.

- Algorithmic trading increases investment efficiency.

- Example: AI-based trading platforms in the US financial market generate billions of dollars annually.

3. Agriculture

- AI helps forecast yields, automate irrigation and fertilization, and optimize resource use.

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- Example: Lely in the Netherlands uses AI to monitor livestock on dairy farms, increasing productivity by 10–15%.

4. Transportation and Logistics

- AI optimizes shipping routes and enhances traffic management efficiency.

- Example: Amazon and DHL use AI to optimize delivery systems, reducing delivery times by 20%.

5. Economic Modernization and Digital Transformation

- AI accelerates digital economy development, optimizes the workforce, and enables faster implementation of innovative solutions.

- Example: South Korea has implemented Industry 4.0 projects using AI, significantly increasing national production volumes.

Discussion – Extended

1. Employment and Workforce Development

- Automation may reduce some low-skilled jobs, but demand for new professions and skilled specialists increases.

- Example: AI developers, data analysts, and robotics engineers represent emerging job opportunities.

2. Data Security and Privacy

- AI systems require protection for large volumes of data.

- Cybersecurity and encryption technologies must develop alongside AI integration.

3. Financial and Intellectual Resources

- Implementing AI technologies requires substantial financial investments and skilled personnel.

- Small and medium-sized enterprises may face constraints due to limited resources.

4. Economic Efficiency and Innovation Growth

- AI increases efficiency in production and services, fostering new products and services.

- Government policies and corporate strategies are crucial for effective AI deployment.

5. International Experiences

- Japan and Germany widely use AI in Industry 4.0 projects.

- China has leveraged AI to enhance productivity in agriculture and manufacturing, as well as automate transportation and logistics systems.

Conclusion. Artificial intelligence plays a crucial role in economic modernization by increasing efficiency, accelerating innovation processes, and strengthening competitiveness. At the same time, AI implementation raises social, financial, and security challenges. Therefore, governments and corporations must adopt strategic approaches when implementing AI technologies.

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