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THE IMPACT OF THE INDUSTRIAL REVOLUTION 5.0 ON ECONOMIC STRUCTURE

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Abstract : The Industrial Revolution 5.0 marks a new era of global economic transformation by integrating artificial intelligence, the Internet of Things (IoT), and human-centric technologies. This shift not only changes patterns of production and consumption but also reshapes the economic structure through improved efficiency, innovation, and human-machine collaboration. In the macroeconomic context, the Industrial Revolution 5.0 accelerates digitalization across strategic sectors, expands technology-based job opportunities, and fosters the growth of creative and knowledge-based industries. However, this transformation also presents challenges such as digital inequality, shifts in labor patterns, and the need for adaptable human resources capable of mastering emerging technologies. This study aims to analyze the impact of the Industrial Revolution 5.0 on the economic structure by highlighting changes in work paradigms, value-added distribution, and the dynamics of sectoral economic growth. The findings indicate that the adoption of advanced technologies can create a more inclusive, sustainable, and innovative economy when supported by responsive policies and education aligned with the demands of this new era.

Keywords: Industrial Revolution 5.0, Digital Economy, Transformation, Technology,

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INTRODUCTION

The Fifth Industrial Revolution (Industry 5.0) marks a new milestone in the history of global economic development by emphasizing collaboration between humans and advanced technologies. Unlike the Fourth Industrial Revolution, which focused on automation and digitalization of processes, Industry 5.0 highlights a human-centric approach in which humans are not replaced by machines but work alongside artificial intelligence (AI) and robotics to create sustainable economic value. This shift brings significant impacts on economic structures, including the transformation of production systems, changes in work patterns, and the emergence of new high-technology industrial sectors. Moreover, ethical, social, and environmental considerations have become essential components in implementing the economy of this new era (Imaduddin & Sari, 2024).

The transition toward the Society 5.0 era introduces new dynamics in economic development that is more inclusive and adaptive to digital technological advancements. The integration of cyber technology and physical systems has accelerated efficiency in various sectors, including manufacturing, services, and trade. Digitalization promotes cost efficiency, faster production, and data-driven innovation. However, this rapid change requires the readiness of human resources and economic policies capable of adapting to the complexities of the new era. Therefore, national adaptation strategies must prioritize the enhancement of technological competencies and digital literacy among society to prevent economic disparities caused by differences in technological capabilities (Astuti, 2023).

The Fifth Industrial Revolution not only influences consumption and production patterns but also fundamentally transforms the structure of the labor force. Artificial intelligence and automation are shifting many routine jobs while creating new opportunities in creative fields and data analysis. In this context, the resulting economic changes demand a restructuring of labor and education policies to produce a workforce that is adaptive to technological advancements. Developing countries such as Indonesia must adjust their industrial strategies to face technological disruptions by strengthening innovative sectors and knowledge-based economies (Fadhil, 2021).

Indonesia’s readiness to face the Fifth Industrial Revolution is crucial for maintaining national economic stability and growth. Government strategies to develop digital infrastructure, expand access to technology-based education, and strengthen innovation regulations are key factors in successfully adapting to this era. In addition, synergy among the public sector, private sector, and academia is needed to form an inclusive and globally competitive digital economic ecosystem.

A lack of preparedness in facing this transformation may result in economic lag and increased social inequality due to uneven technological distribution (Hredaya & Wibawa, 2022).

The development of Industry 5.0 also presents significant opportunities to enhance economic productivity through the integration of intelligent technologies with human creativity. Innovations in production and management systems based on the Internet of Things (IoT) and Artificial Intelligence (AI) enable optimization of supply chains and higher operational efficiency. On the other hand, this revolution fosters the growth of the creative economy sector, which relies on creativity, digital innovation, and high-level technological analytical capabilities. However, its implementation must be accompanied by regulations that support economic sustainability and social welfare in a balanced manner (Nugroho & Yasin, 2023).

In the context of Indonesia's economy, the Fifth Industrial Revolution is expected to act as a catalyst for accelerating digital economic transformation toward an innovation- and knowledge-based society. The success of adapting to this era depends on the nation's ability to strengthen technological education, create pro-innovation policies, and build equitable digital infrastructure across all regions. The integration of technology with human values serves as a fundamental basis to ensure that economic growth focuses not only on efficiency but also on equitable social welfare and environmental sustainability. Thus, Indonesia can leverage the momentum of the Fifth Industrial Revolution as a stepping stone toward a resilient and globally competitive economy (Yuliani & Pratama, 2021).

LITERATURE REVIEW

The Fifth Industrial Revolution represents a phase of economic and technological development that emphasizes the integration of artificial intelligence (AI) and human values within production systems and economic activities. Unlike the Fourth Industrial Revolution, which focuses on automation, Industry 5.0 prioritizes collaboration between humans and machines to create innovation oriented toward sustainability and social welfare. In an economic context, technological development theories assert that technological advancement directly influences changes in economic structure through increased productivity and resource efficiency. Furthermore, creative economy theory explains that economic added value can grow in line with the development of digital innovation and knowledge-based industries. Therefore, the Fifth Industrial Revolution not only drives technological progress but also shifts

the paradigm of economic development toward a more inclusive and human-centered approach based on collaboration between technology and social values (Fadhil, 2021).

1. Theory of the Fifth Industrial Revolution and the Human-Centric Economy

The Fifth Industrial Revolution is a new paradigm that positions humans at the center of every technological innovation. In contrast to Industry 4.0, which is oriented toward automation and production efficiency, the 5.0 concept integrates human values into the use of technology. Collaboration between humans and machines becomes the key element that enables the creation of economic added value not only focused on material profit but also on social sustainability and community well-being. This approach positions humans not merely as technology users but as controllers and decision-makers in determining the direction of digital economic development (Imaduddin & Sari, 2024).

Theoretically, the concept of a human-centric economy emphasizes the importance of balancing technological efficiency with human values in economic development. The application of advanced technologies such as artificial intelligence, robotics, and the Internet of Things (IoT) must be directed toward improving human quality of life rather than replacing it. Thus, the Fifth Industrial Revolution establishes a new foundation for an inclusive economic system rooted in collaboration and empathy. This principle is expected to address the negative impacts of the Fourth Industrial Revolution, which tended to overlook the social and emotional aspects of humans in economic processes (Astuti, 2023).

2. Theory of Digital Transformation and Economic Structure

Digital transformation is a fundamental phenomenon that reshapes the workings of the modern economy through the utilization of information technology. In the context of the Fifth Industrial Revolution, digitalization not only creates efficiency in production processes but also restructures the economy through the emergence of new business models based on digital platforms and big data. This shift accelerates the integration of industrial sectors with a more dynamic digital economic system that is open to innovation. Conceptually, digital transformation is considered a key factor in shaping a high-technology, globally competitive economic system (Fadhil, 2021).

Furthermore, digital transformation theory also highlights its impact on the changing distribution of economic added value across sectors. Companies capable of adapting to new technologies tend to dominate the market, while traditional sectors face significant pressure to adjust. This situation creates challenges in terms of economic equity and employment opportunities. Therefore, public policies must be directed toward supporting a fair digital

transition by considering the readiness of human resources as well as the development of equitable technological infrastructure (Hredaya & Wibawa, 2022).

3. Innovation Theory and the Creative Economy

In the context of the Fifth Industrial Revolution, innovation becomes the main driving force of modern economic growth. Innovation theory emphasizes that economic progress does not solely depend on the accumulation of physical capital but also on the capability to create new ideas, products, and high-value services. The 5.0 era encourages the rise of the creative economy as a concrete manifestation of innovation within the economic system. Knowledge-based industries, digital arts, design, and technology become leading sectors that play a vital role in generating new employment opportunities and enhancing national competitiveness (Rusmini, 2022).

Productivity improvement through innovation is also strengthened by collaboration between humans and intelligent technologies. The use of AI and IoT in creative processes enables higher efficiency while expanding global market reach. This theory asserts that human creativity remains a central element in an increasingly competitive digital economy. Therefore, investment in education and research becomes a strategic factor in strengthening a sustainable and inclusive innovation ecosystem (Nugroho & Yasin, 2023).

4. Technology Readiness Theory and Socio-Economic Adaptation

Technology readiness is one of the key indicators in determining a country's success in facing the Fifth Industrial Revolution era. This theory explains that the ability to adapt to technological changes depends on digital infrastructure, human resources, and supportive innovation policies. Countries with high readiness are able to harness new technologies to enhance productivity, whereas those that lag behind face the risk of economic and social disparities. In the context of Indonesia, this readiness poses a strategic challenge in maintaining global competitiveness (Suherman, 2023).Social aspects also play an important role within technology readiness theory. Society's adaptation to digital economic changes is determined by levels of technological literacy, openness to innovation, and supportive government regulations. Failure to manage this transition may lead to social resistance and widen economic inequality. Therefore, national development strategies must prioritize pro-adaptation policies that integrate technology with social values and local culture, ensuring that the transformation toward the 5.0 era proceeds harmoniously (Shiddiq, 2020).l

5. Digital Economy Theory and Economic Sustainability

Digital economy theory emphasizes that modern economic value is no longer determined solely by physical assets but by the ability to manage data, information, and digital

networks. In the context of the Fifth Industrial Revolution, the digital economy becomes a key driver of sustainable growth through the integration of technology with productive sectors. A data-driven economy creates efficiency, transparency, and innovation that support enhanced global competitiveness. However, to achieve long-term sustainability, fair and responsible data governance and digital regulation are required (Vera Maria & Akram, 2023).

Economic sustainability also requires integrating economic growth with social and environmental preservation. Within this theoretical framework, economic development in the 5.0 era must consider the balance between business profit, social responsibility, and ecosystem protection. The implementation of a sustainability-oriented digital economy can strengthen the foundation of the national economy while reducing the negative impacts of technological inequality. Thus, digital economy and sustainability theory serve as crucial pillars in creating an inclusive and resilient economic future in the era of the Fifth Industrial Revolution (Yuliani & Pratama, 2021).

METHODOLOGY

This study employs a qualitative descriptive approach aimed at gaining an in-depth understanding of the impact of the Fifth Industrial Revolution on the structure of the national economy. This approach was chosen because it effectively describes complex economic transformation phenomena without using numerical analysis, relying instead on the interpretation of concepts, theories, and previous research findings. Research data were collected through a literature study sourced from scientific journals, academic books, economic reports, and official government publications related to digital economic policies and technology-based industrial development. The data collection process was carried out by selecting relevant, credible sources published between 2019 and 2024 to maintain the validity and currency of the information used in this study.

Furthermore, data analysis was conducted using content analysis techniques through three main stages: data reduction, data presentation, and conclusion drawing. Data reduction was performed by identifying important information related to changes in economic structure and social impacts resulting from the Fifth Industrial Revolution. Data presentation was systematically arranged in the form of conceptual explanations to ensure clarity and interpretability. The final stage, conclusion drawing, was carried out by reviewing the relationship between theory and research findings to produce a comprehensive understanding of economic transformation in the Industry 5.0 era, as well as to provide strategic recommendations for the government and economic stakeholders in responding to global digitalization challenges.

RESULTS

The findings of this study indicate that the implementation of Industry 5.0 principles has brought significant changes to Indonesia's economic structure, particularly in the industrial sector, labor market, and entrepreneurship. Collaboration between humans and machines increases efficiency and opens opportunities for the creation of new technology-based jobs. In addition, digitalization of MSMEs has stimulated the growth of the creative economy, which contributes significantly to the national GDP. At the macro level, technological integration and innovation strengthen Indonesia's export competitiveness, while at the micro level, digital transformation encourages the development of business models that are more adaptive and inclusive toward global market changes (Astuti, 2023).

On the other hand, the main challenges faced include digital inequality and the limited availability of human resources with innovative skills. Therefore, government strategies to strengthen digital literacy, expand technological infrastructure, and support local research are key to the successful economic transformation in the Industry 5.0 era. The implementation of technology-based economic policies aligned with societal needs is expected to create a balance between technological advancement and sustainable social development (Nugroho & Yasin, 2023).

Table 1. The Impact of Industry 5.0 on the Production Sector

No	Production aspect	General changes	Impact on Efficiency
1	Automation and AI	Application of intelligent machines	Increasing production efficiency
2	Collaborative robotics	Integration of humans and machines	Reduced operational time
3	Industrial IoT	Real-time monitoring system	More optimal quality control
4	Digital twin technology	Production process simulation	Production planning efficiency
5	Smart energy	Utilization of renewable energy	Cost efficiency and sust

Discussion of the table :

The research findings indicate that the production sector has undergone major transformation through the application of automation technologies based on artificial intelligence and collaborative robotics. These changes create significant efficiency in time

management, reduce human error, and enhance sustainable productivity. Manufacturing companies that integrate the Internet of Things (IoT) and Digital Twin technologies are able to monitor machine performance in real time and anticipate operational disruptions more quickly compared to traditional methods (Imaduddin & Sari, 2024).

In addition, the use of smart energy contributes to cost efficiency and supports green economic policies. This shift demonstrates that industrial efficiency no longer depends solely on human labor, but on human–machine synergy driven by innovation. These impacts strengthen national competitiveness, expand export markets, and promote more sustainable resource efficiency within the context of the modern digital economy (Nugroho & Yasin, 2023).

Table 2. The Influence of Industry 5.0 on the Labor Sector

No	**Employment aspects**	Main impact	Skills required
1	Job automation	Shift in type of work	Digital capabilities
2	Technological innovation	The birth of a New profession	Kreativity and adaptation
3	Humans- machines collaboration	Increase productivity	Emosional intelligence
4	Digital training	Workforce Re-skilling	Data literacy
5	Technology entrepreneurship	Digital starup growth	Innovative leadership

Discussion of the table:

Changes in the labor sector emphasize that the Fifth Industrial Revolution requires a balance between technical capabilities and human-centered skills. Automation has created a major shift from manual jobs toward digital and analytical work. The Indonesian government and educational institutions have begun adapting reskilling and upskilling–based curricula to meet the demands of the digital-era labor market (Hredaya & Wibawa, 2022).

However, the main challenge lies in the digital divide between urban and rural areas. A national training strategy is needed to strengthen digital literacy so that this transformation does not generate new inequalities. The growth of technology-based startups also shows a significant increase, signaling the emergence of a new knowledge-based economy. Thus, humans remain at the center of productivity as long as they are supported by innovative and adaptive competencies aligned with the needs of future industries (Astuti, 2023).

Table 3. The Impact of Industry 5.0 on the National Economic Structure

No	Economics indikators	Structural changes	Macroeconomics impact
1	Kontribution of the technology sector	Significant improvemer	Digital PDB growth
2	Foreign Investment	Capital diversification	Increasing added value
3	Creative economy	Expansion of employment opportunities	Increased competitiveness
4	MSME sector	Business digitalization	Economic inclusion increases
5	Digital commerce	Global market Expansion	Global economic integration

DISCUSSION

At the macro level, the Fifth Industrial Revolution drives structural transformation within the national economy through increased contributions from the technology sector and the creative economy. Digitalization enhances supply chain efficiency and accelerates Indonesia's integration into the global trade ecosystem. In addition, micro, small, and medium enterprises (MSMEs) have begun adopting digital technologies to expand market reach and improve competitiveness (Yuliani & Pratama, 2021).

This transformation has also led to the diversification of foreign direct investment (FDI) into innovation-based sectors. However, to ensure sustainable growth, inclusive fiscal policies and robust digital infrastructure are required. The expansion of the digital economy must also be balanced with adaptive regulations and strong data protection measures. With a well-aligned national strategy, Indonesia has the potential to become a competitive digital economic hub in Southeast Asia (Suherman, 2023).

Table 4. Challenges and Economic Adaptation Strategies in the Industry 5.0 Era

No	Main challenge	Adaptation strategy	Potential impact
1	Digital divide	Strengthening ICT infrastructure	Increasing economic inklusion
2	Limitations of innovative human resources	Educational reform	Increasing national competence

3	Dependence on foreign technology	Strengthening research lokal	Technological independence
4	Cyber security risks	Strengthening digital regulation	Stability of the digital economy
5	Regulatory delays	Policy harmonization	Increasing global competitiveness

Discussion of the table:

The Industry 5.0 era presents significant challenges for Indonesia's economy, particularly concerning the digital divide and the limited availability of innovative human resources. The development of ICT infrastructure becomes a top priority to ensure that digital transformation is not only enjoyed by major cities but also reaches underdeveloped regions. The government needs to strengthen local technological research and development to reduce dependence on foreign innovation (Rusmini, 2022).

In addition, cybersecurity becomes a critical issue that must be addressed to maintain the stability of the national digital economy. Harmonization of policies between the public and private sectors is required to create an inclusive, secure, and competitive digital economic ecosystem. These adaptation strategies will ensure that Indonesia becomes not only a technology user but also a producer of innovation capable of supporting sustainable economic growth in the new industrial era (Vera Maria & Akram, 2023).

CONCLUSION AND RECOMMENDATIONS

This conclusion highlights that the Fifth Industrial Revolution has a broad impact on the restructuring of the national economy through increased production efficiency, digital transformation of the workforce, and the strengthening of the creative economy sector. Collaboration between humans and technology serves as the fundamental basis for building a highly competitive and sustainable economy. However, the successful implementation of this revolution depends heavily on the readiness of human resources, adaptive government policies, and synergy between the public and private sectors in creating an inclusive and equitable digital economic ecosystem for all segments of society.

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