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Philosophy Of Science in the Era of Society 5.0: Reflections on the Role of Artificial Intelligence

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Abstract. *This article aims to reflect on the relevance of the philosophy of science in facing the dynamics of the Society 5.0 era, characterized by the dominance of digital technology and artificial intelligence (AI). This research uses a qualitative method with a descriptive-philosophical approach and library research. Data were collected through a critical review of credible primary and secondary literature, then analyzed reflectively to interpret the relationship between the philosophy of science, knowledge, values, and technological progress. The results show that the philosophy of science has an important role as a reflective foundation in understanding the nature of science and truth amidst technological acceleration. This article aims to reflect on the relevance of the philosophy of science in facing the dynamics of the Society 5.0 era, characterized by the dominance of digital technology and artificial intelligence (AI). This research uses a qualitative method with a descriptive-philosophical approach and library research. Data were collected through a critical review of credible primary and secondary literature, then analyzed reflectively to interpret the relationship between the philosophy of science, knowledge, values, and technological progress. The results show that the philosophy of science has an important role as a reflective foundation in understanding the nature of science and truth amidst technological acceleration.*

Keywords: *Philosophy of science, Society 5.0, Artificial Intelligence*

INTRODUCTION

The development of science and technology in the 21st century has brought fundamental changes to all aspects of human life. The Industrial Revolution 4.0, characterized by digitalization and automation, has now evolved into the era of Society 5.0, a societal order that emphasizes the balance between technological progress and human values. In this context, artificial intelligence (AI) has emerged as a key pillar influencing how humans think, work, interact, and even define their existence in the modern world (Fadli, 2021).

The era of Society 5.0 and advances in information technology have driven significant changes in various sectors, including education, communication, economics, and social life. This transformation not only impacts the way humans conduct their activities but also alters the way science is acquired, disseminated, and developed. The presence of digital technology has now become an integral part of everyday life, opening up various opportunities while simultaneously posing complex challenges for the scientific world. Therefore, a philosophical study of science is crucial to understanding the impact of digital transformation on the essence and practice of science (Judijanto et al., 2024).

Artificial intelligence continues to experience rapid development, capable of fundamentally changing human lifestyles. AI is closely related to computer science, a technological discipline that aims to create tools for problem-solving. Through self-learning algorithms, AI can manage and disseminate data, evaluate itself,

and reason and make decisions like humans. However, AI remains limited to processing and developing human ideas, and therefore cannot independently generate new ideas (Rifky et al., 2024).

Society 5.0 doesn't simply position technology as a tool, but rather makes it an integral part of social life, aiming to improve the quality of human life. However, this technological advancement raises profound philosophical issues. Questions about the nature of knowledge, the sources of knowledge, and humanity's ethical responsibility towards its creations become relevant for reflection. The philosophy of science, as a discipline that examines the foundations, structure, and purpose of science, plays a crucial role in providing a reflective framework for understanding these changes (Redhana, 2024).

The role of AI in the modern world has transcended its functional limitations as a mere technology. AI now participates in decision-making, the creation of works, and scientific research. This situation demands a more in-depth philosophical study: whether AI can be considered an epistemic subject, to what extent its role influences the nature of scientific truth, and how humans can maintain their rational autonomy amidst increasingly autonomous technological advances. From a philosophical perspective, the Society 5.0 era demands critical reflection on the role of AI in scientific practice and social life. AI must be understood not merely as an instrument, but as an entity that influences the dynamics of knowledge, decision-making, and the epistemic structure of modern society. The study of the philosophy of science provides a framework for assessing how AI interacts with human values, moral responsibility, and scientific principles, ensuring that humans remain the primary subjects guiding the use of technology. Therefore, reflection on the role of artificial intelligence in the Society 5.0 era is a crucial step in ensuring that technological progress aligns with the goals of science and the sustainability of humanistic values (Rustandi et al., 2025).

The philosophy of science states that every technological development must always be linked to epistemological and ethical considerations. The digital transformation occurring in the Society 5.0 era not only presents opportunities to expand knowledge capacity and research efficiency, but also demands critical awareness of its impact on scientific practice and the structure of knowledge itself. Therefore, philosophical reflection is essential to assess the extent to which technological advances can support the responsible development of science, while ensuring that human values remain the primary foundation for scientific application and decision-making (Khairanis & Aldi, 2024).

In line with this, the philosophy of science also emphasizes the importance of building an epistemic framework that is adaptive to technological innovation, including artificial intelligence. AI, while capable of accelerating data analysis and predicting complex trends, still requires human interpretation to produce meaningful and valuable knowledge. Therefore, the integration of AI into scientific practice requires not only technical mastery but also a philosophical awareness capable of assessing the ethical, social, and epistemological implications of every decision made by an intelligent system. This approach ensures that technological development aligns with the goals of science, namely to improve human understanding of reality while maintaining the sustainability of human values in the era of Society 5.0 (Syafei, 2025).

METHOD

This research employs a qualitative method with a descriptive-philosophical approach. Qualitative methods were chosen because they are most appropriate for answering research questions that require in-depth exploration, critical reflection, and conceptual analysis of the dynamics of the philosophy of science in the face of the onslaught of artificial intelligence (AI) technology in the Society 5.0 Era. This approach is taken to facilitate researchers in exploring the meaning, relationships, and philosophical implications of the presence of AI on the nature of science, values, and truth. This research also refers to previous research and relevant discourses on the philosophy of technology, so that a qualitative approach is considered suitable for formulating a reflective and contextual analysis (Pugu et al., 2024).

The type of research used is library research. This means that the main data and arguments in this study are constructed through in-depth searches and reviews of credible and academic literature sources (Mahanum, 2021). These sources include books, scientific journals, articles in online databases (such as Google Scholar, Scopus, and JSTOR), and other printed and online documents relevant to the themes of philosophy of science, Society 5.0, and artificial intelligence.

The data sources in this study consist of primary and secondary data. Primary data were obtained from major philosophical works that directly address the philosophy of science, philosophy of technology, and the ethics of artificial intelligence, including the writings of influential figures and thinkers in these fields (Fuadi et al., 2025). Secondary data, namely supporting literature used to enrich and strengthen the analysis. Secondary data sources include scientific articles, theoretical study books, systematic literature reviews, and

other scientific publications that provide additional context about Society 5.0 and the technical development of artificial intelligence. The data collection technique used is documentation technique. This technique is carried out by identifying, reviewing, selecting, and recording key information from all selected data sources. Source selection is based on the relevance, authority of the author, and the validity of the source to the research topic. Data analysis is carried out by reducing data, organizing it based on the research theme and focus, and systematically arranging it in the form of a complete scientific narrative. This analysis process aims to produce a deep understanding of the challenges and opportunities of philosophy of science in the Society 5.0 Era, as well as formulating logical and provocative reflections and conclusions in accordance with the research objectives (Nurhayati et al., 2024).

RESULTS AND DISCUSSION

The research findings show that the philosophy of science continues to play a crucial role as a reflective foundation for understanding the nature of knowledge and truth in the era of Society 5.0. This study emphasizes that artificial intelligence (AI) is not merely a technological tool, but rather a component that influences epistemic processes and scientific decision-making. AI expands human analytical capacity and improves data processing efficiency, but interpretation, judgment, and moral responsibility remain with the human subject. Therefore, the integration of AI into modern society must always be guided by philosophical reflection that emphasizes the interconnectedness of knowledge, values, and ethical responsibility.

Furthermore, the findings of this study demonstrate that the philosophy of science in the Society 5.0 era serves as a reflective framework guiding the development of artificial intelligence to ensure it remains aligned with humanitarian goals. Through the perspective of the philosophy of science, AI is not merely understood as a technical instrument, but is also analyzed from ontological, epistemological, and axiological dimensions. Although AI can expand analytical capacity and accelerate data processing, the emphasis on values, meaning, and moral responsibility remains with humans as subjects of knowledge. Thus, the philosophy of science functions as a controlling instrument for technological rationality, ensuring that AI-based innovations adhere to ethical and humanitarian principles in Society 5.0 (Marina et al., 2024).

Philosophical reflection on the role of AI emphasizes the need for a humanistic and sustainable knowledge paradigm. The era of Society 5.0 demands the integration of digital intelligence and human reflective capacity so that scientific innovation does not lose its moral orientation. The philosophy of science provides a conceptual foundation for creating a balance between technological progress and human values, so that AI can function as a means of deepening human understanding of reality, rather than replacing humans as epistemic subjects. Thus, the philosophy of science serves as a normative guide for the development of artificial intelligence that remains oriented toward ethical responsibility and the benefit of humanity.

Finally, the results of this study indicate that the application of the philosophy of science in the context of Society 5.0 is not only normative, but also a strategy in building critical awareness of the application of AI. By placing humans as the primary subject in the epistemic process, the philosophy of science provides an evaluation of every decision and output produced by AI, including its impact on social, ethical, and cultural values. This approach emphasizes that the development of artificial intelligence must always be linked to critical reflection, so that every technological innovation not only increases efficiency or productivity, but also strengthens human understanding of the nature of science and moral responsibility in modern society.

1.1 Philosophy of Science as a Reflective Foundation in the Era of Society 5.0

Science serves as a conceptual framework that guides humans in understanding the nature of knowledge, truth, and values amidst rapid technological change. In the context of Society 5.0, the philosophy of science plays a role not only in explaining scientific structures and methods but also in providing critical reflection on the direction and goals of scientific development (Gatriyani et al., 2023). Increasingly autonomous technological progress demands an epistemological awareness that science is not merely a rational instrument for mastering nature, but also a means to broaden understanding of humanity and humanity (Z. D. Rahman et al., 2024).

The philosophy of science asserts that scientific knowledge is always linked to a value dimension. Therefore, in facing artificial intelligence technology, humans need to place science within an ethical and humanistic framework (Ramli et al., 2023). Without a strong philosophical foundation, technological advances have the potential to displace humans as subjects of knowledge and replace them with the logic of machines lacking moral awareness (M. T. Rahman, 2020).

Thus, the philosophy of science plays a crucial role in ensuring that scientific and technological developments remain aligned with the well-being of humanity. In the context of Society 5.0, the relationship between humans and technology should be complementary, not competitive. Science needs to be directed toward creating a balance between artificial intelligence and moral intelligence, so that every technological innovation remains rooted in human values. This philosophical reflection guides scientists and policymakers to focus not only on efficiency and productivity but also on ethical aspects, social responsibility, and sustainability in every application of science.

1.2 Artificial Intelligence as an Epistemological Challenge

Within the framework of Society 5.0, artificial intelligence plays a role far beyond its mere function as a tool. AI has the ability to analyze data, support decision-making, and even generate information that has the potential to influence the scientific process (Purnama et al., 2025). This phenomenon raises a crucial epistemological question: the extent to which AI can be viewed as a subject of knowledge or merely as an instrument for information processing. From a philosophical perspective, AI cannot yet be categorized as an epistemic subject because it lacks the consciousness, values, or moral considerations inherent in humans. AI only generates knowledge instrumentally, while the interpretation and meaning of that knowledge remain in the hands of humans (Apdillah et al., 2025).

The implications of this situation emphasize the central role of humans in determining scientific truth. While AI can expand analytical capacity and improve data processing efficiency, final decisions, interpretations, and ethical considerations remain human-centered. This aligns with the principles of the philosophy of science, which emphasize the interconnectedness of knowledge, values, and moral responsibility as the primary foundation of scientific practice (Kushariyadi et al., 2024).

Thus, the epistemological challenges presented by artificial intelligence demand a redefinition of the boundaries between humans and machines in the search for scientific truth. The role of AI must be understood as a cognitive partner that expands human rational capabilities, not as a substitute for the subject of knowledge itself. In this context, the philosophy of science serves to ensure that the use of AI remains within a healthy epistemic corridor, namely by placing humans as the determinants of the meaning, direction, and value of any knowledge produced. This awareness is crucial so that technological advances do not lead to a reduction in the essence of knowledge and humanity, but instead enrich the reflective and ethical dimensions of scientific development in the era of Society 5.0.

1.3 Reflection on the Role of Artificial Intelligence in the Era of Society 5.0

Artificial intelligence in the Society 5.0 era plays a strategic role in expanding the capacity of human knowledge. AI is capable of rapid data analysis, supporting decision-making, and generating information that can influence the direction of research and the scientific process. This role demonstrates that AI is not merely a tool but has become an integral part of modern epistemic dynamics (Subekti et al., 2024). From a philosophical perspective, it's important to reflect on the extent to which AI influences the nature of knowledge. AI generates knowledge instrumentally, while humans remain the subjects who interpret and give it meaning. This emphasizes that while AI expands analytical capabilities and efficiency, responsibility for scientific truth and value remains with humans (Pratama et al., 2023).

Reflecting on the role of AI also shows that this technology should be directed towards strengthening human understanding of science, not replacing human reflective capacity. AI can help simplify complex data, accelerate innovation, and unlock new insights, but its use and interpretation must always be tempered by philosophical considerations. Thus, Society 5.0 will be a society that is not only technologically savvy but also capable of critical reflection on the role of artificial intelligence in shaping science and social practice (Nampira et al., 2025).

In other words, reflection on the role of artificial intelligence in the era of Society 5.0 demands an integration of technological rationality and philosophical wisdom. The use of AI should not only focus on efficiency and productivity, but also consider ethical, humanitarian, and sustainability dimensions. Within the framework of the philosophy of science, this means building

a holistic scientific paradigm, where technology serves to strengthen reasoning, deepen understanding of reality, and foster moral awareness at every stage of innovation. With this approach, AI becomes not only a symbol of intellectual progress but also an instrument that strengthens humanistic values in the development of science and social life.

CONCLUSIONS AND SUGGESTIONS

The philosophy of science remains a crucial reflective foundation for understanding the nature of knowledge, truth, and value amidst accelerating technological progress. Artificial intelligence (AI) has played a crucial role in expanding analytical capacity, supporting decision-making, and accelerating the scientific process, making it an integral component of the dynamics of modern knowledge. However, AI is instrumental and lacks the consciousness, values, or moral capacities inherent in humans. Therefore, interpretation, meaning-making, and ethical responsibility remain with human subjects. The integration of AI into scientific practice and social life must be guided by philosophical reflection that emphasizes the interconnectedness of knowledge, values, and moral responsibility.

Reflecting on the role of AI shows that this technology should be directed at strengthening human capacity to understand science, not replacing our reflective and critical abilities. Thus, Society 5.0 can be realized as a society that is not only technologically savvy but also capable of critical reflection on the role of AI in shaping science, scientific decisions, and social practices based on human values.

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