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DIRECTION OF PHILOSOPHICAL THOUGHT IN THE CONTEXT OF SCIENCE

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Abstract

Philosophy plays a fundamental role in the development of science by providing critical reflection on the nature, sources, methods, and purposes of knowledge. This study aims to analyze the direction of philosophical thought in the context of science, particularly through the perspectives of ontology, epistemology, and axiology. Using a qualitative approach with a literature study method, this research examines various philosophical and scientific works that discuss the relationship between philosophy and the development of knowledge. The findings indicate that philosophy functions as a foundational framework that guides scientific inquiry, prevents scientific arrogance, integrates fragmented disciplines, and ensures that scientific progress remains aligned with ethical and humanistic values. Thus, philosophy of science serves not only as a theoretical reflection but also as a critical and constructive force in shaping the evolution of scientific knowledge in response to contemporary challenges.

Keywords: philosophy of science; ontology; epistemology; axiology; scientific development

Abstract

Philosophy plays a fundamental role in the development of science because it provides critical reflection on the nature, sources, methods, and goals of knowledge. This study aims to analyze the direction of philosophical thought in the context of science, specifically through the study of ontology, epistemology, and axiology. This study uses a qualitative approach with a literature study method, by examining various scientific works in the form of books and journal articles that discuss the relationship between philosophy and the development of science. The results of the study indicate that philosophy functions as a conceptual foundation that directs the development of science, prevents scientific arrogance, integrates various disciplines, and ensures that scientific progress remains oriented towards ethical and humanitarian values. Thus, the philosophy of science plays not only a theoretical reflection, but also a critical and constructive force in shaping the direction of scientific development amidst the dynamics of the times.

Keywords: philosophy of science; ontology; epistemology; axiology; science

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INTRODUCTION

The development of science has long been intertwined with the role of philosophy, which provides the foundation for critical, reflective, and systematic thinking. Since the early stages of human intellectual history, philosophy has served as the mother of various branches of science, playing a pivotal role in shaping scientific inquiry and guiding its evolution (Mahbubi, 2024). Philosophy has been integral in addressing fundamental questions regarding the nature of reality, the sources of truth, and the purpose and value of knowledge itself. As a discipline, philosophy is not confined merely to abstract theorizing, but rather serves as an essential framework that informs and shapes the development of science. It ensures that scientific pursuits remain meaningful and ethically responsible in their quest for knowledge (Retnosari, 2020).

In the context of modern science, the rapid advancement of knowledge and technology has led to significant epistemological and axiological challenges. These challenges include the fragmentation of scientific disciplines, a crisis of values, and an increasing tendency toward scientific arrogance, wherein scientific progress is pursued without sufficient regard for its broader ethical implications. Without a solid philosophical foundation, science risks losing its humanitarian orientation and may become disconnected from the moral values that should underpin its endeavors. Science, when divorced from philosophy, has the potential to focus solely on technical achievements while neglecting the societal and ethical responsibilities that it should uphold. This disconnection between science and its moral grounding is a growing concern, especially as scientific advances such as artificial intelligence, genetic engineering, and environmental manipulation continue to advance at an unprecedented pace (Hastangka & Santoso, 2021).

The philosophy of science, therefore, plays an indispensable role as a tool for critical reflection. It serves as a way to examine and scrutinize the foundations of scientific knowledge, questioning its nature, methodologies, and the goals it aims to achieve (Hastangka & Santoso, 2021). By reflecting upon the fundamental assumptions that guide scientific inquiry, philosophy can help safeguard science from falling into ideological dogma or ethical irresponsibility. In this light, the philosophy of science does not merely remain an abstract discipline but functions as a dynamic framework that shapes the development of science while ensuring that it stays aligned with ethical and humanistic values (Sudarmin et al., 2023).

The philosophy of science systematically explores three primary aspects: ontology, epistemology, and axiology. Ontology is concerned with the nature of reality and the objects of scientific study, seeking to understand what exists and how it can be categorized (Mahbubi, 2024). Epistemology, on the other hand, examines the sources, methods, and validity of knowledge, probing the foundations of how we know what we know. Meanwhile, axiology focuses on the ethical dimensions of science, assessing the values, goals, and consequences of scientific endeavors in relation to human life. These three pillars are essential in guiding scientific inquiry and in ensuring that the development of science is not only intellectually robust but also ethically sound and socially beneficial. Through these interconnected aspects, the philosophy of science facilitates a more holistic understanding of the direction in which scientific thought should evolve, fostering a framework that integrates scientific progress with moral and social responsibility (Sudarmin et al., 2023).

Contemporary studies emphasize that the philosophy of science plays a critical role not only as a theoretical reflection on scientific practices but also as a constructive force in shaping the direction of scientific development. Recent studies have demonstrated that philosophy is instrumental in testing the assumptions underlying scientific theories, evaluating the robustness of scientific methods, and offering value-oriented guidance to ensure that science serves humanity's best interests (Octaviana & Ramadhani, 2021). The philosophy of science helps evaluate whether scientific advancements align with ethical principles, ensuring that they contribute to the greater good rather than causing harm or fostering societal inequalities. Moreover, it supports the idea that scientific progress should be coupled with an understanding of its broader implications for human welfare, the environment, and the future of humanity (Mahbubi, 2025a).

In addition, the philosophy of science serves as a guide for integrating various scientific disciplines that often develop in isolation from one another. By providing a philosophical lens through which to view scientific inquiry, philosophy enables a more interconnected understanding of science, encouraging the development of interdisciplinary approaches that transcend narrow specializations. Such integration is crucial in addressing complex global challenges, such as climate change, public health crises, and technological ethics, where solutions require the collaboration of various scientific fields. Philosophy also acts as a critical dialogue partner for the development of science and technology, ensuring that these advancements remain grounded in human values and contribute to the sustainability of life on Earth (Rindiani et al., 2025). Through its focus on values, ethics, and human well-being, philosophy can guide scientific progress towards outcomes that benefit society as a whole.

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Given the crucial role that philosophy plays in shaping the direction of scientific development, it is imperative to undertake a comprehensive study of the philosophy of science. Such a study can help to elucidate the ways in which philosophy contributes to the critical, responsible, and ethical development of science. By examining the philosophical foundations of science through the lenses of ontology, epistemology, and axiology, this study aims to ensure that scientific inquiry is not only intellectually rigorous but also ethically informed and socially responsible. As science continues to advance at an exponential rate, it is essential that we ground these advancements in philosophical reflection to prevent the fragmentation of knowledge and to promote the broader humanistic goals of science. Ultimately, this study seeks to emphasize that science must remain aligned with values that prioritize human dignity, the common good, and the sustainable future of all life on Earth.

Through this comprehensive exploration, the study will contribute to a deeper understanding of how philosophy influences science and how it can continue to shape the trajectory of scientific development in a way that serves humanity. As science and technology become increasingly powerful forces in the modern world, it is essential to ensure that they are guided by ethical considerations that reflect our collective responsibility towards one another and the planet.

RESEARCH METHODS

The research employs a qualitative approach, utilizing literature study as the primary method for data collection. This approach was chosen due to its relevance and effectiveness in exploring complex philosophical issues, as it allows for an in-depth examination of existing literature and scholarly works related to the topic of the philosophy of science. The literature study approach is well-suited for research that aims to critically analyze theoretical concepts and frameworks, especially when empirical data is not the central focus (Mufidah & Mansur, 2025).

The data for this research were obtained through a systematic review of both primary and secondary sources. Primary sources included key philosophical texts and foundational books on the philosophy of science (Mahbubi, 2025b). These primary sources provided the essential theoretical foundation for the research, offering insights from classical and contemporary philosophers of science. The texts reviewed were selected based on their

relevance to the core aspects of the philosophy of science, including ontology, epistemology, and axiology, which are central to understanding the nature, methods, and ethical implications of science (Sudarmin et al., 2023).

In addition to primary sources, secondary sources such as journal articles, academic papers, and other scholarly publications were also utilized. Secondary sources were particularly valuable in providing current discussions and debates surrounding the philosophy of science, reflecting contemporary perspectives and updates in the field. These sources were chosen for their scholarly rigor and their direct connection to the research topic (Mahbubi, 2025b). They helped establish a broader context for understanding how philosophical frameworks are applied in the development and critique of scientific knowledge. Secondary sources also helped map out the current state of scientific inquiry and the challenges that arise in relation to the ethical and philosophical foundations of science (Octaviana & Ramadhani, 2021).

The analysis of the data was conducted qualitatively, focusing on synthesizing and interpreting the key ideas and arguments presented in the selected literature. The process involved a systematic approach to organizing and evaluating the information, identifying core themes, and drawing connections between different philosophical concepts and frameworks (Mahbubi, 2025b). The data were examined through the lens of the philosophy of science, with a particular emphasis on the relationship between scientific knowledge, its ontological and epistemological underpinnings, and its ethical dimensions. This approach allowed for a comprehensive and nuanced understanding of the research topic, highlighting the critical role of philosophy in shaping scientific practice and ensuring that science remains ethically grounded (Rindiani et al., 2025).

Furthermore, the research involved mapping the framework of scientific knowledge through a reflective process, where the findings from the literature were systematically grouped and categorized based on their relevance to the philosophical dimensions of science. This mapping process helped to clarify the theoretical foundations of science and its ethical boundaries, providing a clearer understanding of how philosophical thought contributes to the development of scientific inquiry. By engaging with both classical and contemporary works, the research aimed to offer a balanced and insightful perspective on the evolving role of philosophy in science (Retnosari, 2020).

In conclusion, the qualitative literature study method used in this research allowed for a thorough exploration of the philosophical aspects of science. By reviewing and analyzing both primary and secondary sources, the study provides a comprehensive understanding of how philosophy influences and guides the development of scientific knowledge. The systematic

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analysis of these sources, coupled with the critical evaluation of contemporary discussions, contributes to the ongoing dialogue about the philosophical foundations of science and its ethical implications.

RESULTS AND DISCUSSION

Direction of Philosophical Thought in the Context of Science

The word philosophy literally means the love of wisdom, derived from two Greek words: 'phileo' (love) and 'sophia' (wisdom). This indicates that the essence of philosophy is the search for wisdom. (Sudarmin et al. 2023)

Philosophy is the search for a general understanding of values and reality through speculative means. This signifies the natural urge necessary in humans to know themselves, the world in which they live and move, and a sense of belonging. Philosophy is a comprehensive idea about human nature and the nature of reality that serves as a guide for life to determine the path of life and how to treat others, governed by philosophical considerations. Philosophy is the nature of existence, the foundation of knowledge, which guides people to support their lives with rational inquiry, aimed at discovering truth and achieving wisdom. (Sudarmin et al. 2023)

According to Socrates, philosophy is a science that seeks to understand the nature of nature and existing reality through reason. Meanwhile, according to Al-Farabi, philosophy is the science of existence, which does not conflict with religion and instead shares the same goal of seeking truth. (Alaby 2024)

Studying philosophy means seeking knowledge about wisdom, principles, and foundations for attaining truth through reasoning, or a way of thinking that considers all things as its object. However, it is important to understand that absolute truth comes only from God, the source of all knowledge. (Muhajarah and Bariklana 2021)

There are three components that form the essential foundation of philosophy: ontology, epistemology, and axiology. Ontology is the essence or nature of knowledge. Epistemology is the central focus of philosophy, encompassing the sources, means, and methods for achieving scientific knowledge. Meanwhile, axiology encompasses the normative value aspect in interpreting truth. (Muhajarah and Bariklana 2021)

The direction of philosophical thought in science is to critically examine the foundations, nature, methods, and objectives of science through three main pillars; 1) Ontology (object), namely the reality and material objects studied, and the nature of their existence, 2) Epistemology (how to acquire knowledge), namely through scientific methods such as observation, experimentation, and logical reasoning, 3) Axiology (value/purpose), namely creating values, benefits, and their ethical implications for human life. Philosophy acts as the "mother" or pioneer of science, testing assumptions, opening new horizons, integrating knowledge, and providing direction and ethics for the development of science so that it remains relevant and inseparable from human values. (Putri Retnosari 2020)

The function and role of philosophy in science is to provide direction, foundation, and guidance for the development of science in a more advanced and solid manner. It serves as a critical dialogue regarding scientific progress, questioning assumptions, and preventing scientific arrogance. It integrates various sciences into a complete (integrative) understanding and unifies fragmented knowledge. It breaks through the boundaries of existing knowledge, paving the way for the emergence of new sciences (for example, the philosophy of science emerged due to the progress of science itself). It thinks deeply, seeking the principles, truth, and clarity behind existing empirical facts. (Rindiani et al. 2025)

In short, philosophy becomes the compass and philosophical foundation for science, ensuring that its development is not only technologically rapid, but also wise and oriented towards human values.

In the course of its development, the need arose to develop a philosophy of science which is very important in providing value or axiology to the development and progress of science and technology.

Essentially, the philosophy of science is a philosophical study of matters related to science. In other words, the philosophy of science is an effort to study and deepen knowledge, including its substantive characteristics, its acquisition, and its benefits for human life. This study is inseparable from the main references of philosophy, which are included in the fields of ontology, epistemology, and axiology, with various developments and deepening carried out by experts. Philosophy plays a crucial role in the development of science, namely to provide broader insights so that the development of science is not accompanied by arrogance. (Setio et al. 2024)

The philosophy of science, as an intellectual discipline that questions the nature, methods, and limitations of science, plays a profound and broad role in the development of science. Through a literature review, it can be concluded that the philosophy of science not

only provides a philosophical foundation for the development of science but also plays a crucial critical and constructive role. (Mufidah and Mansur 2025)

In the context of philosophical foundations, the philosophy of science provides insight into the nature of science, guiding scientists to a deeper understanding of their objects of study. Explaining what science is, how its objects of study can be identified, and the values underlying it all provide a solid philosophical foundation. (Muzakir et al. 2024)

As a critical discipline, the philosophy of science is expected to play a role as a foundation and direction for resolving fundamental problems in the social, ideological, political, economic, educational, and other fields. Furthermore, the philosophy of science is expected to serve as a dialogue partner and a means of critical inquiry into the development of science. (Rahman 2020)

function of philosophy of science involves its ability to assess and critique the assumptions, methods, and results of scientific research. Through rational, logical, and critical analysis, philosophy of science helps maintain the validity of science, ensuring that the research process and data interpretation are conducted with integrity and objectivity. (Octaviana and Ramadhani 2021)

Meanwhile, the constructive function of philosophy of science points to its role in making a positive contribution to the development of science. By determining the direction of development, formulating scientific research problems, and developing scientific research methods, philosophy of science provides a conceptual foundation for scientists. This involves identifying new trends, innovative scientific paradigms, and developing new methodologies that can help transcend existing limitations. The construction of science in philosophical thought has become an important study because the science referred to in this study is knowledge that leads to change, discovery, the use of valid methods in approaching problems, and the generation of systematic knowledge. (Hastangka and Santoso 2021)

Thus, the philosophy of science is not only a theoretical reflection of science, but also a driving force in directing and shaping the evolution of science. Its existence as an integral element in the development of science demonstrates that collaboration between the philosophy of science and science itself is not an option, but rather a necessity for achieving a deeper and more holistic understanding. (Nurroh 2017)

The goal of science itself is to seek explanations for observed phenomena, allowing for a full understanding of the nature of the object at hand. This knowledge enables humans to understand and provides tools for mastering a problem. This applies to both the natural and social sciences. However, even with science, humans cannot absolutely know everything; human knowledge remains limited. (Karimalaina et al. 2023)

Knowledge is a characteristic that distinguishes humans from other living creatures, such as animals. Animals possess static knowledge. This is illustrated by the fact that, from ancient times to the present, birds and bees have only possessed the same abilities and techniques for building cages or homes. Humans, on the other hand, possess dynamic knowledge that continues to evolve over time. This dynamic nature is influenced by our ability to digest experiences, contemplate, reflect, reason, and research in an effort to understand the environment and solve complex problems. (Astuti 2020)

Science is the actualization of knowledge derived from reason and law. Science will guide one to clarify matters. Science also guides humans to fulfill their human nature, namely, to be leaders in the world. Based on knowledge, humans can operate and utilize the world's facilities optimally. (Rahman 2020)

Dynamic science is constantly changing and evolving over time. Exploring and reviewing scientific knowledge to find up-to-date subjects is both a requirement and a necessity. (Astuti 2020)

All forms of knowledge fall within the field of philosophy, and their limitations depend on the philosophical system adopted. As science develops, it is capable of creating its own distinct domains. Philosophy has led to the birth of configurations that illustrate how branches of knowledge develop within the dynamics of scientific development. (Muzakir et al. 2024)

CONCLUSION

Based on the results of the literature review, it can be concluded that philosophy plays a fundamental role in the development and advancement of science. Philosophy not only serves as the forerunner to the birth of various scientific disciplines, but also serves as a reflective foundation that deeply examines the nature, methods, and goals of science. Through an ontological, epistemological, and axiological approach, the philosophy of science provides a systematic conceptual framework for understanding reality, acquiring valid knowledge, and determining the value and benefits of science for human life.

The direction of philosophical thought in the context of science demonstrates that philosophy plays a role as a guide, critic, and integrator of science. The philosophy of science serves to test the basic assumptions of science, prevent scientific arrogance, and ensure that scientific development is inseparable from ethical and humanitarian values. Thus, the philosophy of science is not merely reflective and theoretical, but also has a critical and constructive function in shaping the paradigms, methods, and orientations of scientific development.

Amidst the increasingly complex dynamics of scientific and technological development, the philosophy of science has become increasingly relevant. It serves as an intellectual compass, maintaining a balance between scientific progress and moral responsibility. Therefore, the integration of philosophy and science is an inseparable necessity to realize scientific development that is not only technically advanced but also wise, just, and oriented towards the welfare of humanity.

REFERENCES

Alaby, M. A. (2024). Filsafat Ilmu sebagai Arah Pengembangan Ilmu Pengetahuan dan Teknologi. *AJJP*, *3*(3), 132–139.

Astuti, E. T. (2020). FILSAFAT ILMU PENGETAHUAN SEBAGAI ARAH PENGEMBANGAN BERPIKIR YANG KONSTRUKTIF: Telaah Pemikiran Pragmatis Charles S. Peirce dan Kontribusinya dalam Pembelajaran Sains Pendidikan Dasar Islam. *At-Tajdid*, *9*(1), 1–16.

Hastangka, & Santoso, H. (2021). Arah dan Orientasi Filsafat Ilmu di Indonesia. *Jurnal Filsafat Indonesia*, *4*(3), 287–295.

Karimaliana, Zaim, M., & Thahar, H. E. (2023). Pemikiran Rasionalisme: Tinjauan Epistemologi terhadap Dasar-Dasar Ilmu Pendidikan dan Pengetahuan Manusia. *Journal of Education Research*, *4*(4), 2486–2496.

Mahbubi, M. (2024). *Filsafat Ilmu; Sebuah Catatan Ringkas*. Global Aksara.

Mahbubi, M. (2025a). Filsafat Pendidikan Islam di Era AI: Integrasi Epistemologi dan Aksiologi Islam. *An-Nuha*, *5*(1), Article 1. https://doi.org/10.24036/annuha.v5i1.591

Mahbubi, M. (2025b). *METOPEN FOR DUMMIES: Panduan Riset Buat Kaum Rebahan, Tugas Akhir Lancar, Rebahan Tetap Jalan!*, (1 ed.). Global Aksara Pers.

Mufidah, N. M., & Mansur, A. (2025). PERKEMBANGAN FILSAFAT DAN ILMU, PENGERTIAN FILSAFAT ILMU, DAN ARAH FILSAFAT ILMU. *IJIS*, *1*(1), 14–22.

Muhajarah, K., & Bariklana, M. N. (2021). RELIGION, SCIENCE AND PHILOSOPHY. *Mu'allim*, *3*(1), 1–14.

Muzakir, K., Aqlima, C. N., Simbolon, T., Agusrian, K., & Dongoran, R. (2024). Filsafat sebagai Dasar Perkembangan Ilmu Pengetahuan. *Jurnal Ilmiah Nusantara*, *1*(4), 217–229.

Nurroh, S. (2017). *FILSAFAT ILMU*. GRADUATE OF SCHOOL UNIVERSITAS GADJAH MADA.

Octaviana, D. R., & Ramadhani, R. A. (2021). HAKIKAT MANUSIA: Pengetahuan (Knowladge), Ilmu Pengetahuan (Sains), Filsafat Dan Agama. *Jurnal Tawadhu*, *5*(2), 143–159.

Rahman, M. T. (2020). *Filsafat Ilmu Pengetahuan*. Prodi S2 Studi Agama-Agama UIN Sunan Gunung Djati.

Retnosari, P. (2020). FILSAFAT ILMU SEBAGAI DASAR DAN ARAH PENGEMBANGAN ILMU (KAJIAN FILOSOFIS TERHADAP PERKEMBANGAN IPTEK). *JURNAL WIDYALOKA IKIP WIDYA DARMA*, *7*(1), 109–118.

Rindiani, N., Putri, N. I., Trisnawati, N., Ibrahim, D., & Syarnubi. (2025). Sejarah dan Peran Pemikiran Filsafat dalam Pertumbuhan Ilmu Pengetahuan. *Inovasi*, *4*(3), 800–815.

Setio, J., Isyara, L. P., Ibrahim, D., & Syarnubi. (2024). SEJARAH DAN PERANAN PEMIKIRAN FILSAFAT DALAM PERKEMBANGAN ILMU PENGETAHUAN. *AT-TAJDID*, *8*(1), 8–20.

Sudarmin, Muhammad, A. W. A., Jariah, A., & J, M. I. A. (2023). HUBUNGAN FILSAFAT DENGAN PENDIDIKAN ISLAM. *Saraweta*, *1*(02), 109–115.